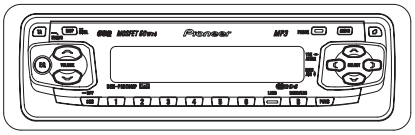
Pioneer *sound.vision.soul*

Service Manual



DEH-P3500MP/XM/EW

ORDER NO.
CRT3020

MULTI-CD CONTROL HIGH POWER CD/MP3 PLAYER WITH RDS TUNER

DEH-P3500MP XM/EW

COMPACT disc DIGITAL AUDIO

● This service manual should be used together with the following manual(s):

Model No.	Order No.	Mech. Module	Remarks
CX-3057	CRT3026	S10MP3	CD Mech. Module:Circuit Description, Mech.Description, Disassembly

For details, refer to "Important symbols for good services".

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SAFETY INFORMATION

This service manual is intended for qualified service technicians; it is not meant for the casual do-it-yourselfer. Qualified technicians have the necessary test equipment and tools, and have been trained to properly and safely repair complex products such as those covered by this manual.
Improperly performed repairs can adversely affect the safety and reliability of the product and may void the warranty. If you are not qualified to perform the repair of this product properly and safely, you should not risk trying to do so and refer the repair to a qualified service technician.

1. Safety Precautions for those who Service this Unit.

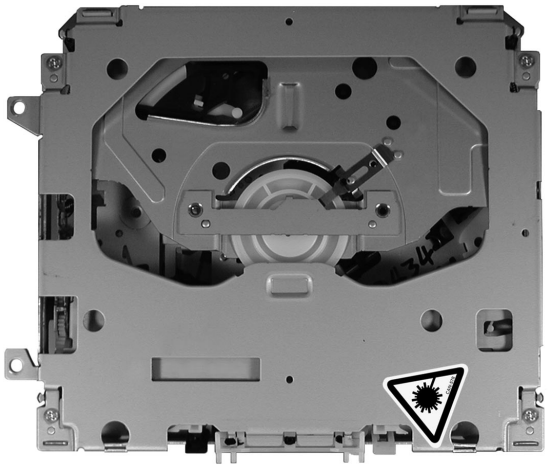
- **When checking or adjusting the emitting power of the laser diode exercise caution in order to get safe, reliable results.**

Caution:

1. **During repair or tests, minimum distance of 13cm from the focus lens must be kept.**
2. **During repair or tests, do not view laser beam for 10 seconds or longer.**

2. A "CLASS 1 LASER PRODUCT" label is affixed to the bottom of the player.

3. The triangular label is attached to the mechanism unit frame.



4. Specifications of Laser Diode

Specifications of laser radiation fields to which human access is possible during service.
Wavelength = 800 nanometers

[Important symbols for good services]
In this manual, the symbols shown-below indicate that adjustments, settings or cleaning should be made securely.
When you find the procedures bearing any of the symbols, be sure to fulfill them:

1. Product safety

You should conform to the regulations governing the product (safety, radio and noise, and other regulations), and should keep the safety during servicing by following the safety instructions described in this manual.

2. Adjustments

To keep the original performances of the product, optimum adjustments or specification confirmation is indispensable. In accordance with the procedures or instructions described in this manual, adjustments should be performed.

3. Cleaning

For optical pickups, tape-deck heads, lenses and mirrors used in projection monitors, and other parts requiring cleaning, proper cleaning should be performed to restore their performances.

4. Shipping mode and shipping screws

To protect the product from damages or failures that may be caused during transit, the shipping mode should be set or the shipping screws should be installed before shipping out in accordance with this manual, if necessary.

5. Lubricants, glues, and replacement parts

Appropriately applying grease or glue can maintain the product performances. But improper lubrication or applying glue may lead to failures or troubles in the product. By following the instructions in this manual, be sure to apply the prescribed grease or glue to proper portions by the appropriate amount.For replacement parts or tools, the prescribed ones should be used.

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● CD Player Service Precautions

1. Before disassembling the unit, be sure to turn off the power. Unplugging and plugging the connectors during power-on mode may damage the ICs inside the unit.
2. To protect the pickup unit from electrostatic discharge during serviving, take an appropriate treatment(shorting-solder) by referring to "the DISASSEMBLY" on page 51.
3. After replacing the pickup unit, be sure to check the grating.(See p.48.)

1. SPECIFICATIONS

General

Power source ..... 14.4 V DC (10.8 – 15.1 V allowable)
Grounding system ..... Negative type
Max. current consumption ..... 10.0 A
Backup current ..... 5.0mA or less
Dimensions (W × H × D):
- DIN
  - Chassis ..... 178 × 50 × 157 mm
  - Nose ..... 188 × 58 × 19 mm
- D
  - Chassis ..... 178 × 50 × 162 mm
  - Nose ..... 188 × 58 × 19 mm

Weight ..... 1.4 kg

Audio

Maximum power output ..... 50 W × 4
Continuous power output ... 27 W × 4 (DIN 45324, +B=14.4 V)
Load impedance ..... 4 Ω (4 – 8 Ω allowable)
Preout max output level/output impedance ..... 2.2 V/1 kΩ
Equalizer (3-Band Parametric Equalizer):
- Low
  - Frequency ..... 40/80/100/160 Hz
  - Q Factor ..... 0.35/0.59/0.95/1.15 (+6 dB when boosted)
  - Gain ..... ±12dB
- Mid
  - Frequency ..... 200/500/1k/2k Hz
  - Q Factor ..... 0.35/0.59/0.95/1.15 (+6 dB when boosted)
  - Gain ..... ±12dB
- High
  - Frequency ..... 3.15k/8k/10k/12.5k Hz
  - Q Factor ..... 0.35/0.59/0.95/1.15 (+6 dB when boosted)
  - Gain ..... ±12dB

Loudness contour
- Low ..... +3.5 dB (100 Hz), +3 dB (10 kHz)
- Mid ..... +10 dB (100 Hz), +6.5 dB (10 kHz)
- High ..... +11 dB (100 Hz), +11 dB (10 kHz) (volume: –30 dB)

CD player

System ..... Compact disc audio system
Usable discs ..... Compact disc
Signal format:
- Sampling frequency ..... 44.1 kHz
- Number of quantization bits ..... 16; linear

Frequency characteristics ... 5 – 20,000 Hz (±1 dB)
Signal-to-noise ratio ..... 94 dB (1 kHz) (IEC-A network)
Dynamic range ..... 92 dB (1 kHz)
Number of channels ..... 2 (stereo)
MP3 decoding format ..... MPEG-1 & 2 Audio Layer 3

FM tuner

Frequency range ..... 87.5 – 108.0 MHz
Usable sensitivity ..... 8 dBf (0.7 μV/75 Ω, mono, S/N: 30 dB)
50 dB quieting sensitivity ..... 10 dBf (0.9 μV/75 Ω, mono)
Signal-to-noise ratio ..... 75 dB (IEC-A network)
Distortion ..... 0.3 % (at 65 dBf, 1 kHz, stereo)
0.1 % (at 65 dBf, 1 kHz, mono)
Frequency response ..... 30 – 15,000 Hz (±3 dB)
Stereo separation ..... 45 dB (at 65 dBf, 1 kHz)
Selectivity ..... 80 dB (±200 kHz)

MW tuner

Frequency range ..... 531 – 1,602 kHz (9 kHz)
Usable sensitivity ..... 18 μV (S/N: 20 dB)
Signal-to-noise ratio ..... 65 dB (IEC-A network)

LW tuner

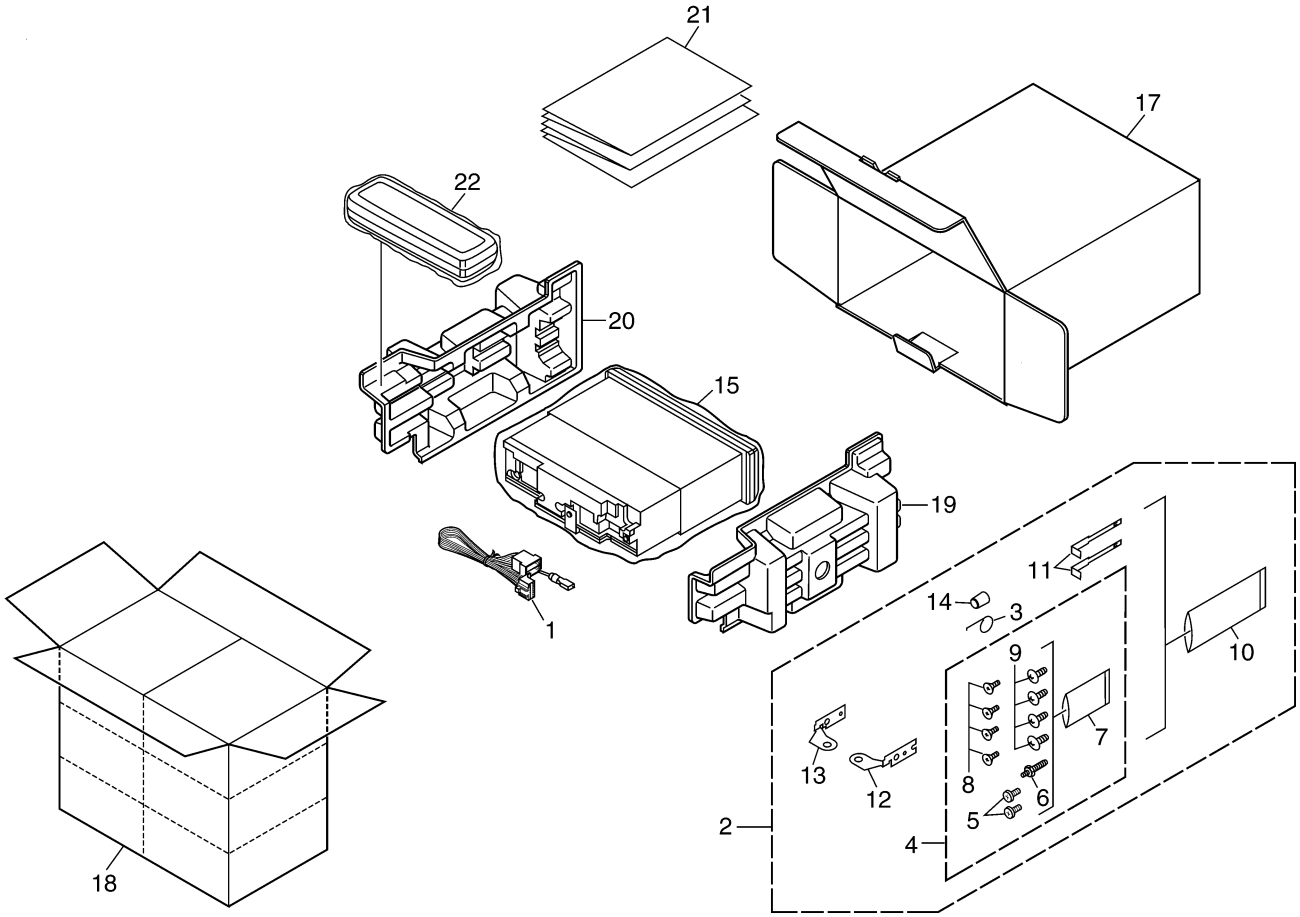
Frequency range ..... 153 – 281 kHz
Usable sensitivity ..... 30 μV (S/N: 20 dB)
Signal-to-noise ratio ..... 65 dB (IEC-A network)

Note

Specifications and the design are subject to possible modifications without notice due to improvements. ▣

2. EXPLODED VIEWS AND PARTS LIST

2.1 PACKING



NOTE:

- Parts marked by "*" are generally unavailable because they are not in our Master Spare Parts List.
- Screws adjacent to ∇ mark on the product are used for disassembly.
- For the applying amount of lubricants or glue, follow the instructions in this manual.
  (In the case of no amount instructions, apply as you think it appropriate.)

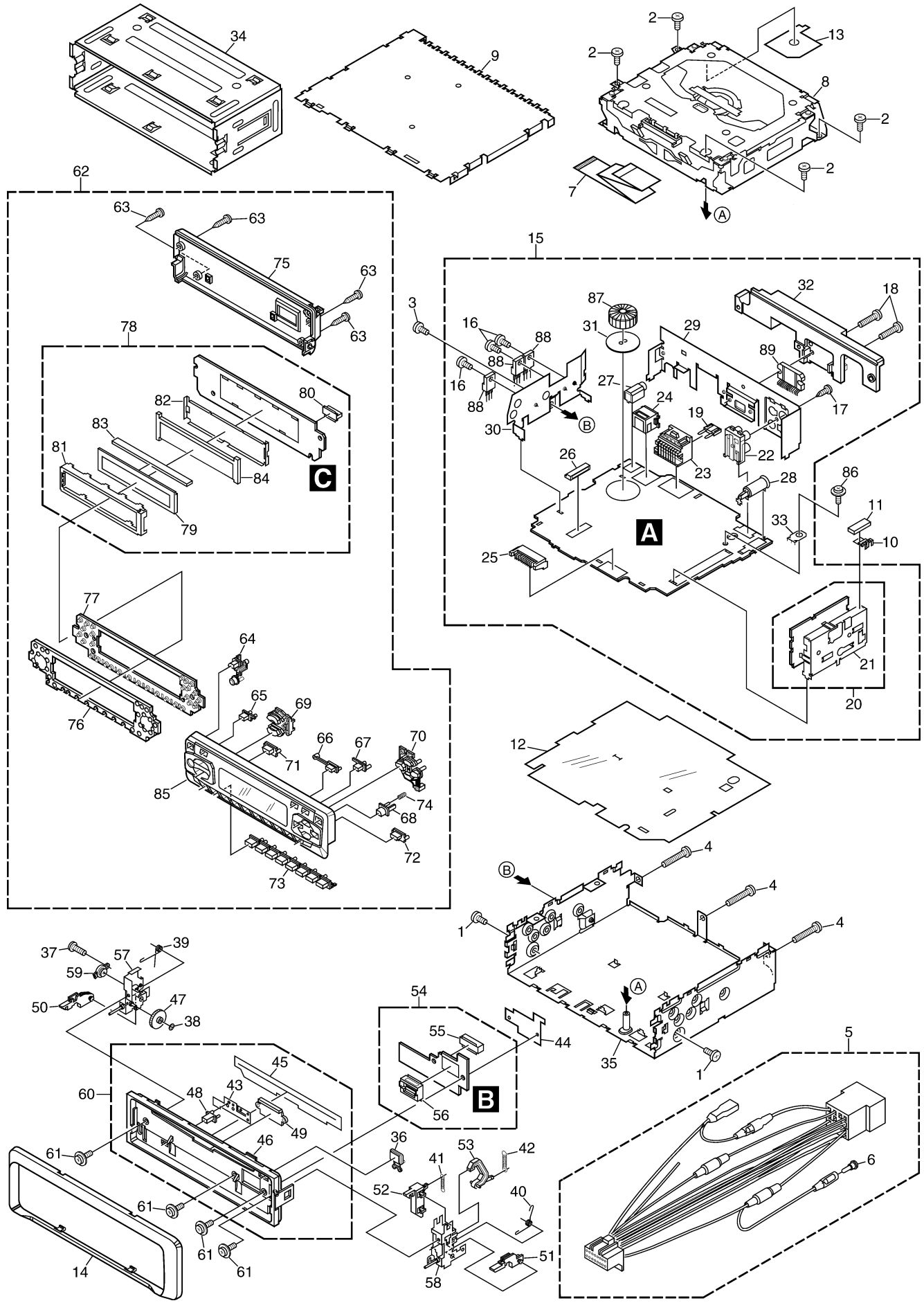
● PACKING SECTION PARTS LIST

Mark	No.	Description	Part No.
	1	Cord Assy	CDE7059
	2	Accessory Assy	CEA3376
	3	Spring	CBH1650
	4	Screw Assy	CEA3445
	5	Fixing Screw	BPZ20P060FZK
	6	Screw	CBA1002
*	7	Polyethylene Bag	CEG-127
	8	Screw	CRZ50P090FTC
	9	Screw	TRZ50P080FTC
*	10	Polyethylene Bag	CEG-158
	11	Handle	CNC5395
	12	Holder	CND1249
	13	Holder	CND1250
	14	Bush	CNV3930
	15	Polyethylene Bag	CEG-162
	16	•••••	
	17	Carton	CHG4951
	18	Contain Box	CHL4951
	19	Protector	CHP2663
	20	Protector	CHP2664
	21-1	Owner's Manual	CRD3672
	21-2	Owner's Manual	CRD3673
	21-3	Owner's Manual	CRD3674
	21-4	Installation Manual	CRD3675
*	21-5	Passport	CRY1013
*	21-6	Warranty Card	CRY1157
	22	Case Assy	CXB3520

● Owner's Manual, Installation Manual

Part No.	Language
CRD3672	English, Spanish
CRD3673	German, French
CRD3674	Italian, Dutch
CRD3675	English, Spanish, German, French, Italian, Dutch

2.2 EXTERIOR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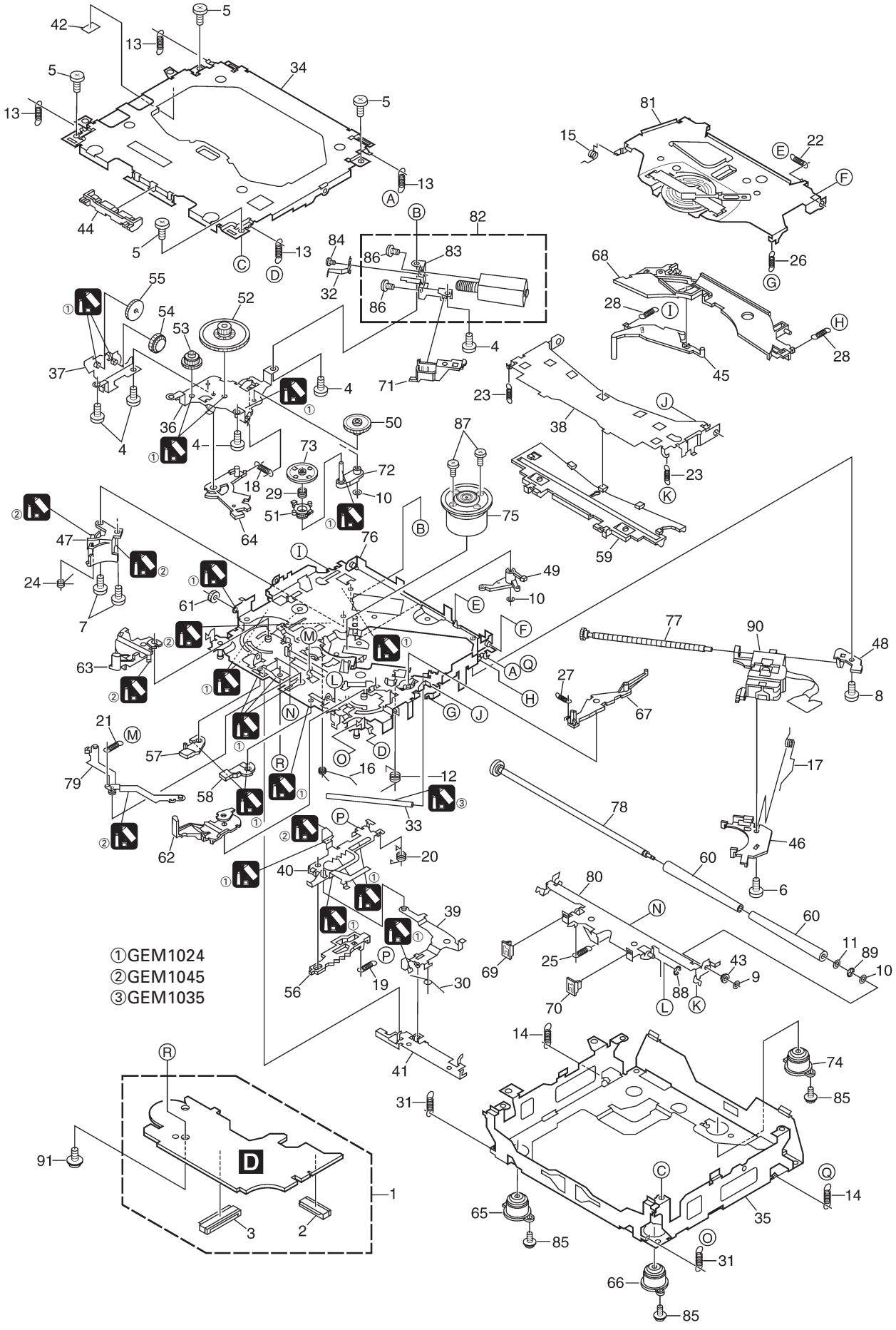
14

● EXTERIOR SECTION PARTS LIST

Mark	No.	Description	Part No.
	1	Screw	BMZ30P040FZK
	2	Screw	BSZ26P060FTC
	3	Screw	BSZ30P060FTC
	4	Screw	BSZ30P200FTC
	5	Cord Assy	CDE7059
	6	Cap	CKX-003
	7	Cable	CDE7188
	8	CD Mechanism Module(S10MP3)	CXK5660
	9	Case	CNB2870
	10	Earth Plate	CNC8915
	11	Cushion	CNM4870
	12	Insulator	CNM7935
	13	Insulator	CNM8174
	14	Panel	CNS6934
	15	Tuner Amp Unit	CWM8652
	16	Screw	ASZ26P060FTC
	17	Screw	BPZ26P080FTC
	18	Screw	BSZ26P160FTC
	19	Fuse(10A)	CEK1208
	20	FM/AM Tuner Unit	CWE1645
	21	Holder	CND1054
	22	Pin Jack(CN351)	CKB1051
	23	Plug(CN981)	CKM1376
	24	Connector(CN101)	CKS3408
	25	Plug(CN831)	CKS3537
	26	Connector(CN721)	CKS3837
	27	Connector(CN801)	CKS4124
	28	Antenna Jack(CN401)	CKX1056
	29	Holder	CND1325
	30	Holder	CND1352
	31	Insulator	CNM8245
	32	Heat Sink	CNR1668
	33	Terminal(CN402)	VNF1084
	34	Holder Unit	CXB6681
	35	Chassis Unit	CXB9635
	36	Button(EJECT)	CAC7752
	37	Screw(M2x2)	CBA1176
	38	Washer	CBF1038
	39	Spring	CBH2650
	40	Spring	CBH2651
	41	Spring	CBH2652
	42	Spring	CBH2653
	43	Spring	CBL1512
	44	Holder	CND1254
	45	Cover	CNM6854
	46	Panel	CNS7245
	47	Gear	CNV5997
	48	Pin	CNV6486
	49	Lighting Conductor	CNV6487
	50	Arm	CNV7400
	51	Arm	CNV7401
	52	Arm	CNV7402
	53	Arm	CNV7403
	54	Panel Unit	CWM8758
	55	Socket(CN1950)	CKS3550
	56	Connector(CN1951)	CKS4462
	57	Holder Unit	CXB9501
	58	Holder Unit	CXB9502
	59	Damper Unit	CXB9503
	60	Service Panel Unit	CXX1691
	61	Screw	IMS20P045FZK
	62	Detach Grille Assy	CXB9592
	63	Screw	BPZ20P100FZK
	64	Button(CLK, EQ)	CAC7778
	65	Button(DISP)	CAC7779
	66	Button(PAUSE)	CAC7780
	67	Button(AUDIO)	CAC7781
	68	Button(OPEN)	CAC7782
	69	Button(VOLUME)	CAC7809
	70	Button(SELECT)	CAC7811
	71	Button(SRC)	CAC7785
	72	Button(FUNC)	CAC7786
	73	Button(1-6)	CAC7787
	74	Spring	CBH2630
	75	Cover	CNS7269
	76	Lighting Conductor	CNV7421
	77	Rubber	CNV7422
	78	Keyboard Unit	CWM8632
	79	LCD(LCD1901)	CAW1757
	80	Connector(CN1901)	CKS4524
	81	Holder	CNC9757
	82	Sheet	CNM7647
	83	Connector	CNV6440
	84	Lighting Conductor	CNV7710
	85	Grille Unit	CXB9620
	86	Screw	ISS26P055FTC
	87	Choke Coil(L981)	CTH1280
	88	Transistor(Q752, 901, 911)	2SD2375
	89	IC(IC301)	PAL007A

2.3 CD MECHANISM MODULE

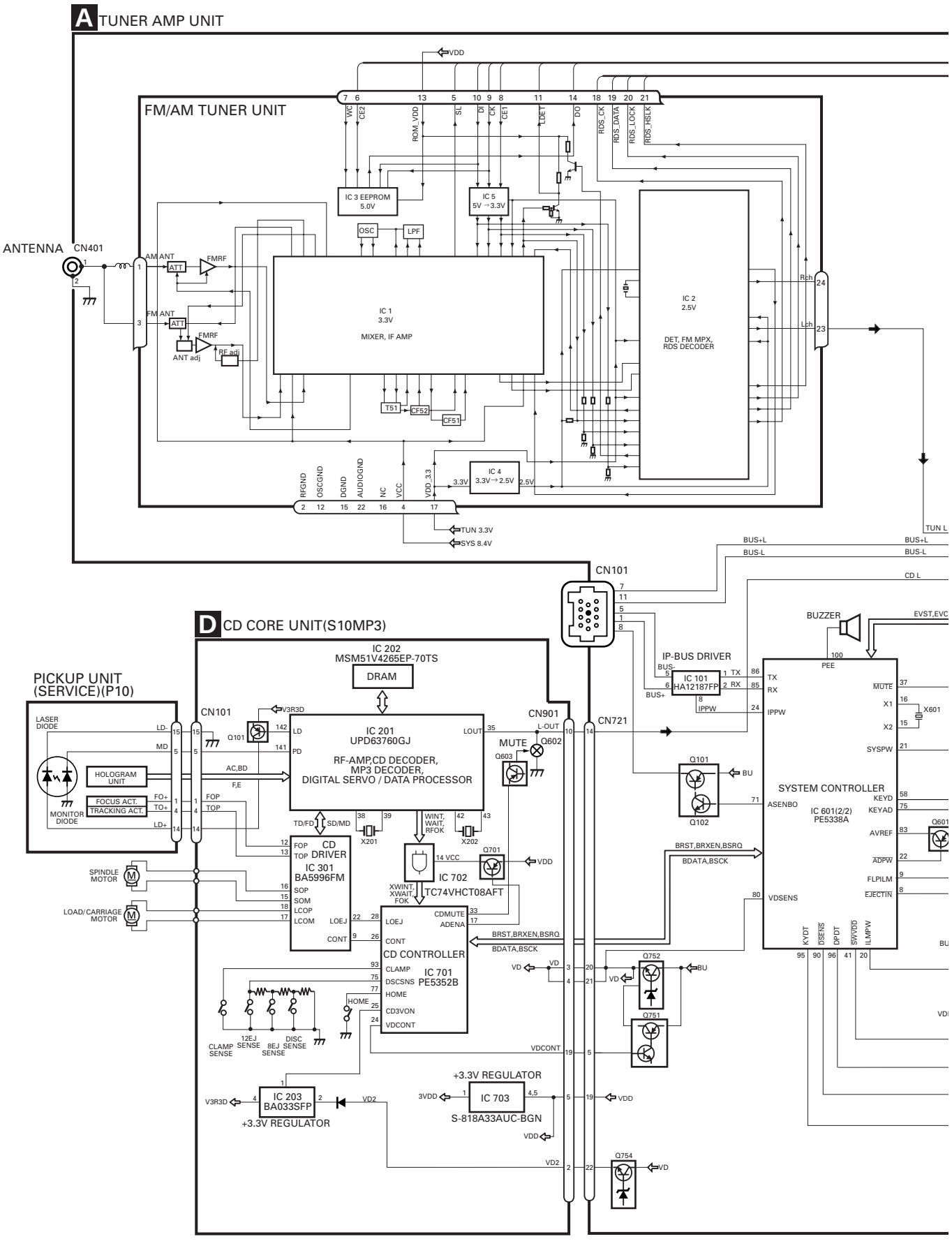


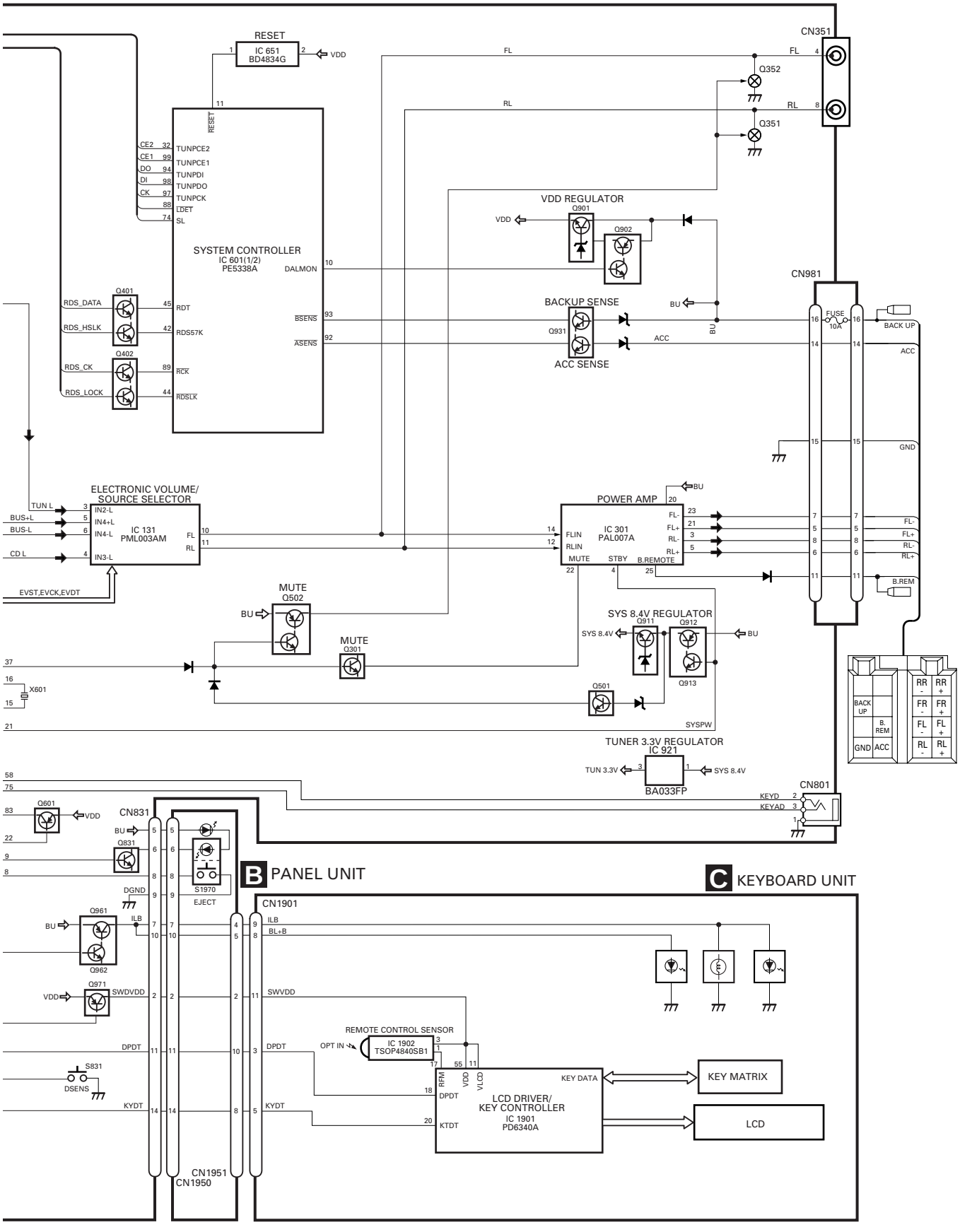
● CD MECHANISM MODULE SECTION PARTS LIST

Mark	No.	Description	Part No.
	1	CD Core Unit(S10MP3)	CWX2742
	2	Connector(CN101)	CKS4182
	3	Connector(CN901)	CKS4017
	4	Screw	BMZ20P035FTC
	5	Screw	BSZ20P040FTC
	6	Screw(M2x4)	CBA1362
	7	Screw(M2x3)	CBA1511
	8	Screw(M2x3)	CBA1527
	9	Washer	CBF1037
	10	Washer	CBF1038
	11	Washer	CBF1060
	12	Spring	CBH2390
	13	Spring	CBH2606
	14	Spring	CBH2607
	15	Spring	CBH2608
	16	Spring	CBH2609
	17	Spring	CBH2610
	18	Spring	CBH2611
	19	Spring	CBH2612
	20	Spring	CBH2613
	21	Spring	CBH2614
	22	Spring	CBH2615
	23	Spring	CBH2616
	24	Spring	CBH2617
	25	Spring	CBH2620
	26	Spring	CBH2621
	27	Spring	CBH2641
	28	Spring	CBH2642
	29	Spring	CBH2643
	30	Spring	CBH2659
	31	Spring	CBH2688
*	32	Spring	CBL1614
	33	Shaft	CLA3845
	34	Frame	CNC9962
	35	Frame	CNC9963
	36	Bracket	CNC9966
	37	Bracket	CNC9967
	38	Arm	CNC9968
	39	Arm	CNC9973
	40	Lever	CNC9983
	41	Lever	CNC9984
	42	Sheet	CNM8134
	43	Collar	CNV6906
	44	Guide	CNV6925
	45	Arm	CNV7198
	46	Rack	CNV7199
	47	Holder	CNV7201
	48	Holder	CNV7202
	49	Arm	CNV7203
	50	Gear	CNV7207
	51	Gear	CNV7208
	52	Gear	CNV7209
	53	Gear	CNV7210
	54	Gear	CNV7211
	55	Gear	CNV7212
	56	Rack	CNV7214
	57	Arm	CNV7215
	58	Arm	CNV7216
	59	Guide	CNV7217
	60	Roller	CNV7218
	61	Gear	CNV7219
	62	Arm	CNV7221
	63	Arm	CNV7220
	64	Arm	CNV7222
	65	Damper	CNV7313
	66	Damper	CNV7314
	67	Arm	CNV7341
	68	Arm	CNV7342
	69	Guide	CNV7360
	70	Guide	CNV7361
	71	Holder	CNV7437
	72	Arm	CNV7444
	73	Gear	CNV7595
	74	Damper	CNV7618
	75	Motor Unit(M1)	CXB6007
	76	Chassis Unit	CXB8728
	77	Screw Unit	CXB8729
	78	Gear Unit	CXB8731
	79	Arm Unit	CXB8732
	80	Arm Unit	CXB8735
	81	Arm Unit	CXB8852
	82	Motor Unit(M2)	CXB8933
	83	Bracket	CNC9985
	84	Screw	JFZ20P020FTC
	85	Screw(M2x5)	EBA1028
	86	Screw	JFZ20P020FTC
	87	Screw	JGZ17P022FTC
	88	Washer	YE15FTC
	89	Washer	YE20FTC
	90	Pickup Unit(Service)(P10)	CXX1641
	91	Screw	IMS26P030FMC

3. BLOCK DIAGRAM AND SCHEMATIC DIAGRAM

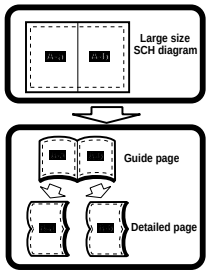
3.1 BLOCK DIAGRAM



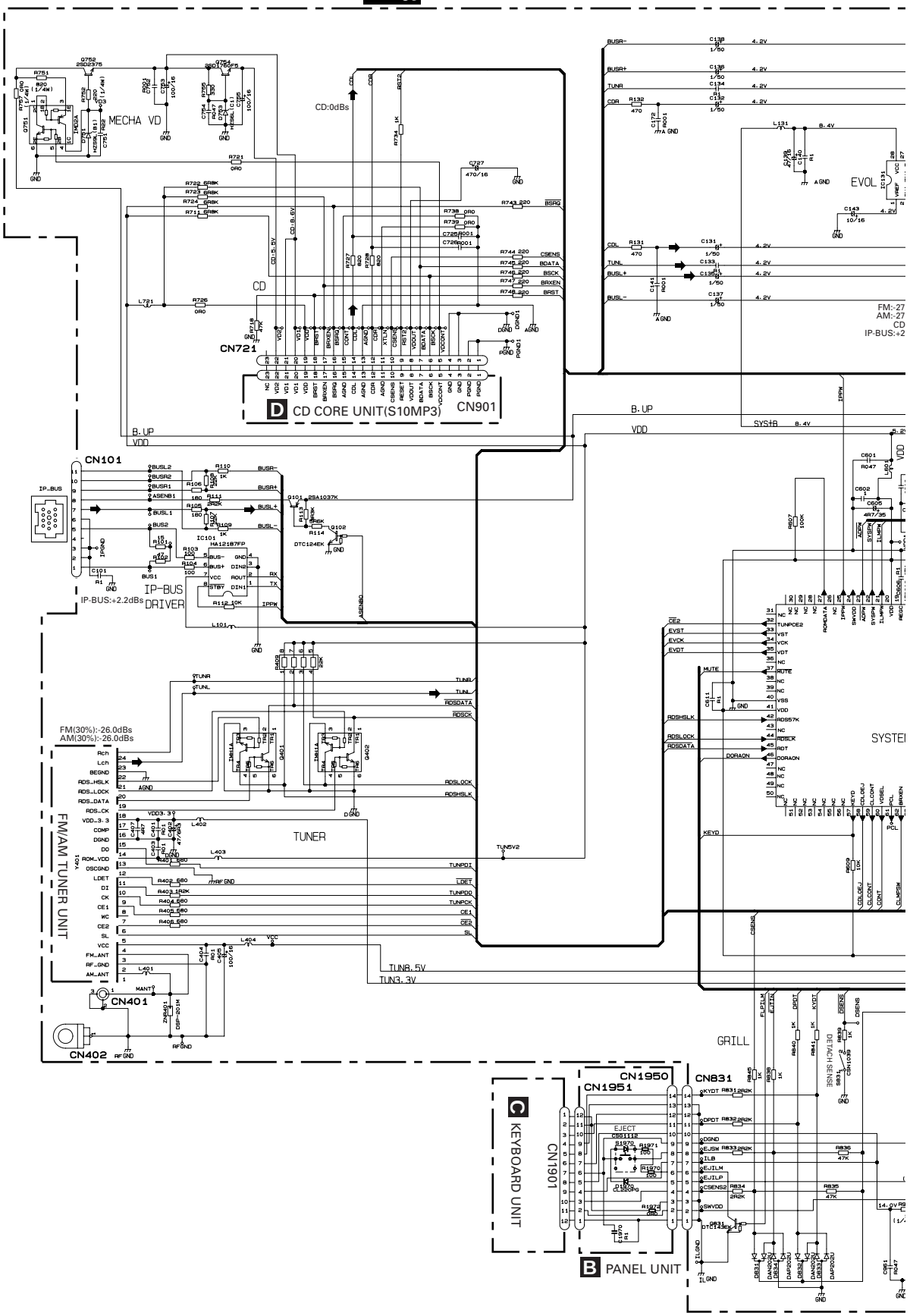

RESET
IC 651
BD4834G
VDD
CN351
FL
RL
Q352
Q351
SYSTEM CONTROLLER
IC 601(1/2)
PE5338A
TUNPCE2
TUNPCE1
TUNPDI
TUNPDO
TUNPCK
LDET
SL
DALMON
BSENS
ASENS
RDT
RDS57K
RCK
RDSLK
RDS_DATA
RDS_HSLK
RDS_CK
RDS_LOCK
Q401
Q402
VDD REGULATOR
Q901
Q902
BACKUP SENSE
Q931
ACC SENSE
BU
ACC
CN981
FUSE
10A
BACK UP
GND
ELECTRONIC VOLUME/
SOURCE SELECTOR
IC 131
PML003AM
TUN L
BUS+L
BUS-L
CD L
IN2-L
IN4+L
IN4-L
IN3-L
EVST,EVCK,EVDT
POWER AMP
IC 301
PAL007A
FLIN
RLIN
MUTE
STBY
B.REMOTE
FL-
FL+
RL-
RL+
B.REM
MUTE
Q502
Q301
SYS 8.4V REGULATOR
Q911
Q912
Q913
SYS 8.4V
SYSPW
Q501
X601
TUNER 3.3V REGULATOR
IC 921
BA033FP
TUN 3.3V
CN801
KEYD
KEYAD
Q601
CN831
Q831
S1970
EJECT
DGND
Q961
Q962
ILB
Q971
SWDVDD
DPDT
S831
DSENS
KYDT
B PANEL UNIT
C KEYBOARD UNIT
CN1901
BL+B
SWVDD
REMOTE CONTROL SENSOR
IC 1902
TSOP4840SB1
OPT IN
RFM
VDD
VLCD
KEY DATA
LCD DRIVER/
KEY CONTROLLER
IC 1901
PD6340A
KTDT
KEY MATRIX
LCD
CN1951
CN1950
RR
FR
FL
RL
B.REM

3.2 OVERALL CONNECTION DIAGRAM(GUIDE PAGE)

Note: When ordering service parts, be sure to refer to "EXPLODED VIEWS AND PARTS LIST" or "ELECTRICAL PARTS LIST".

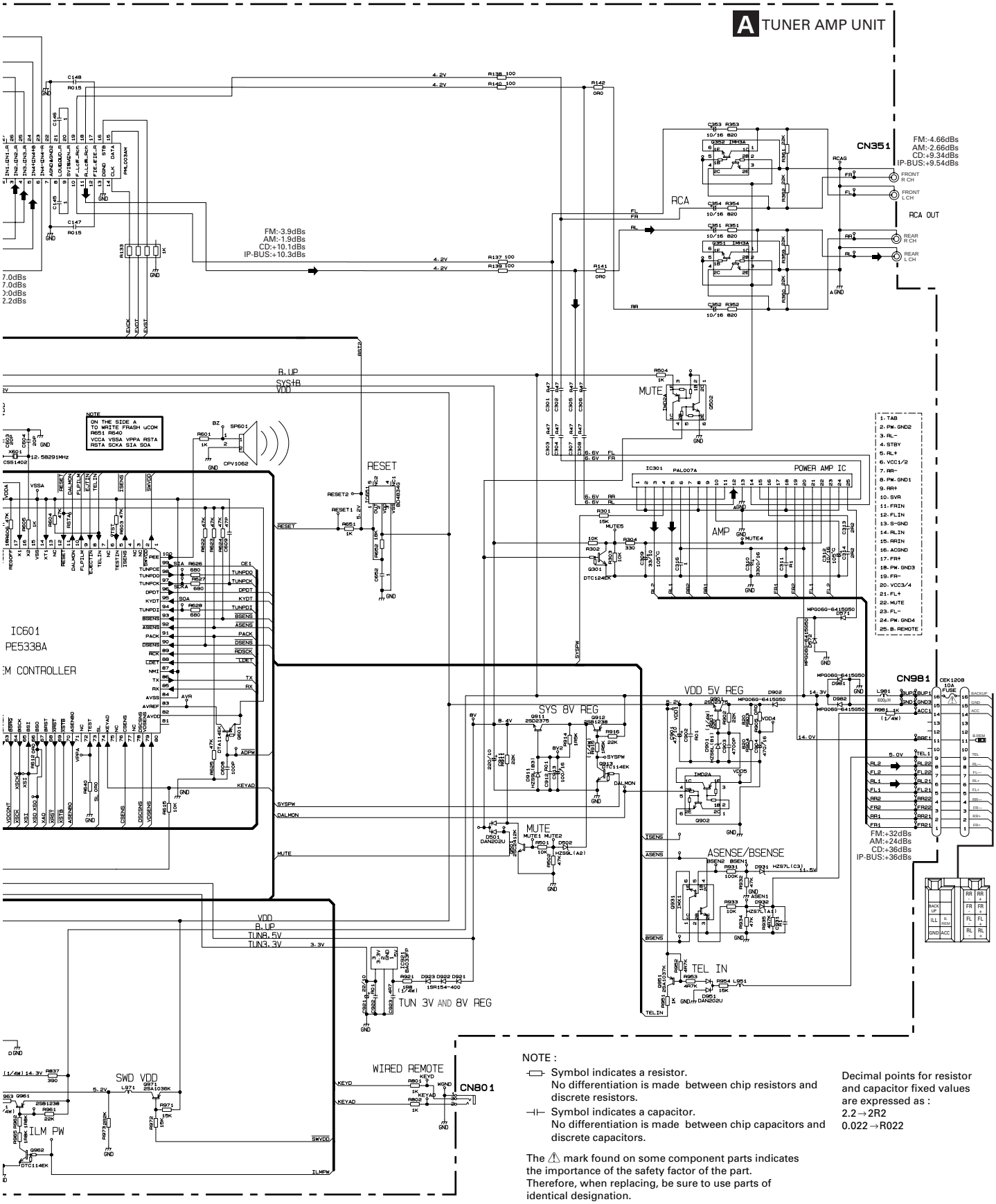


A-a



A-b

A TUNER AMP UNIT

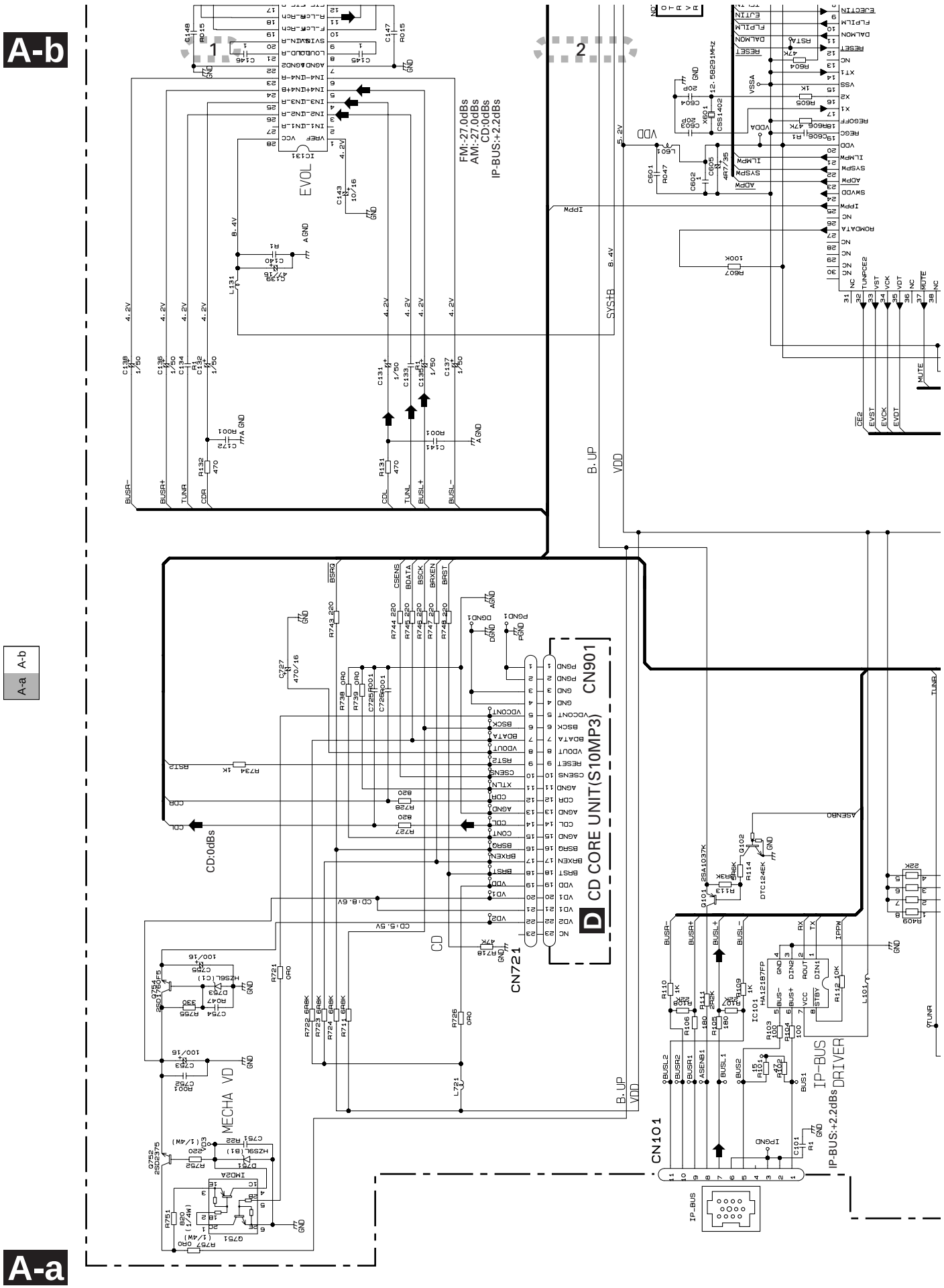


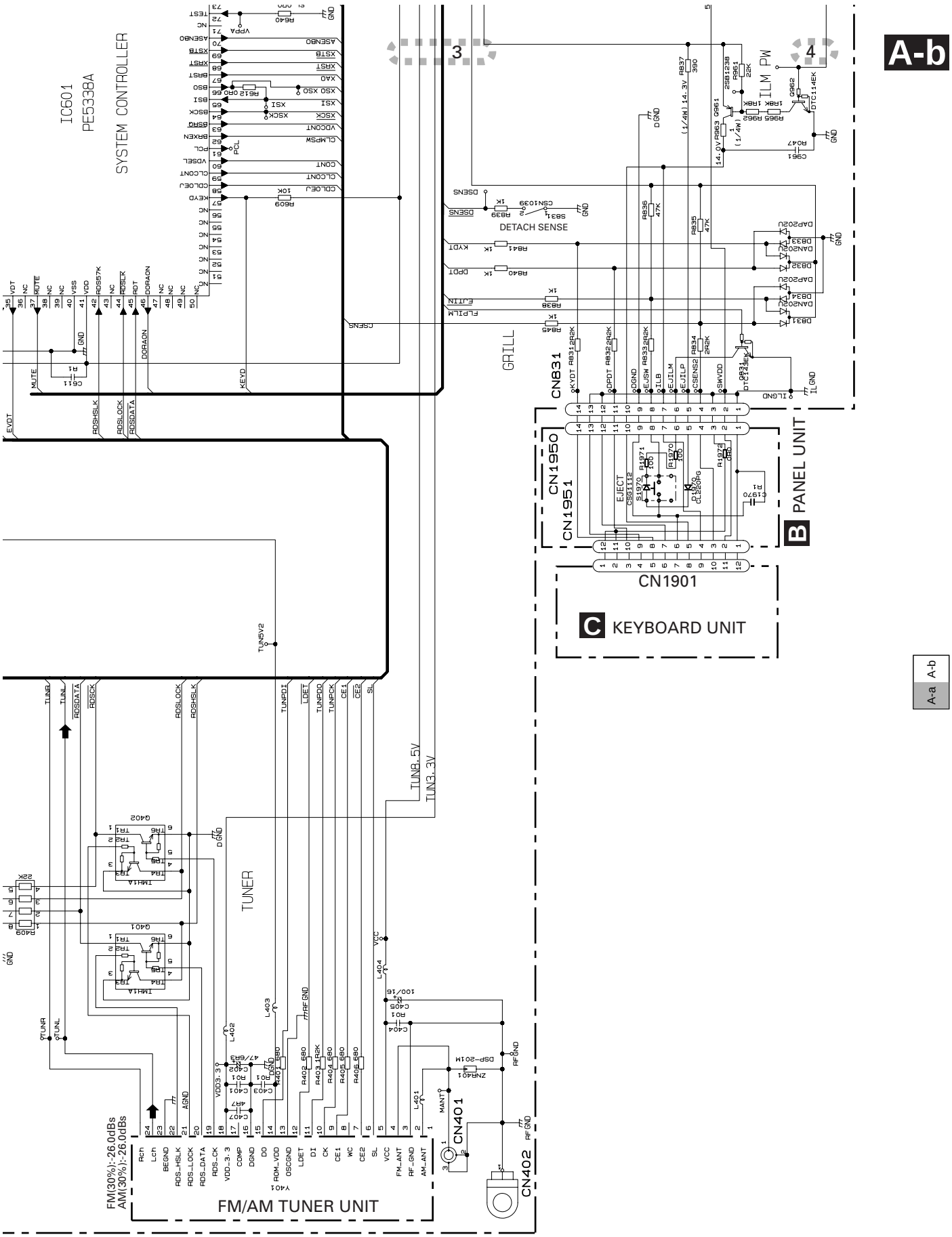
NOTE :

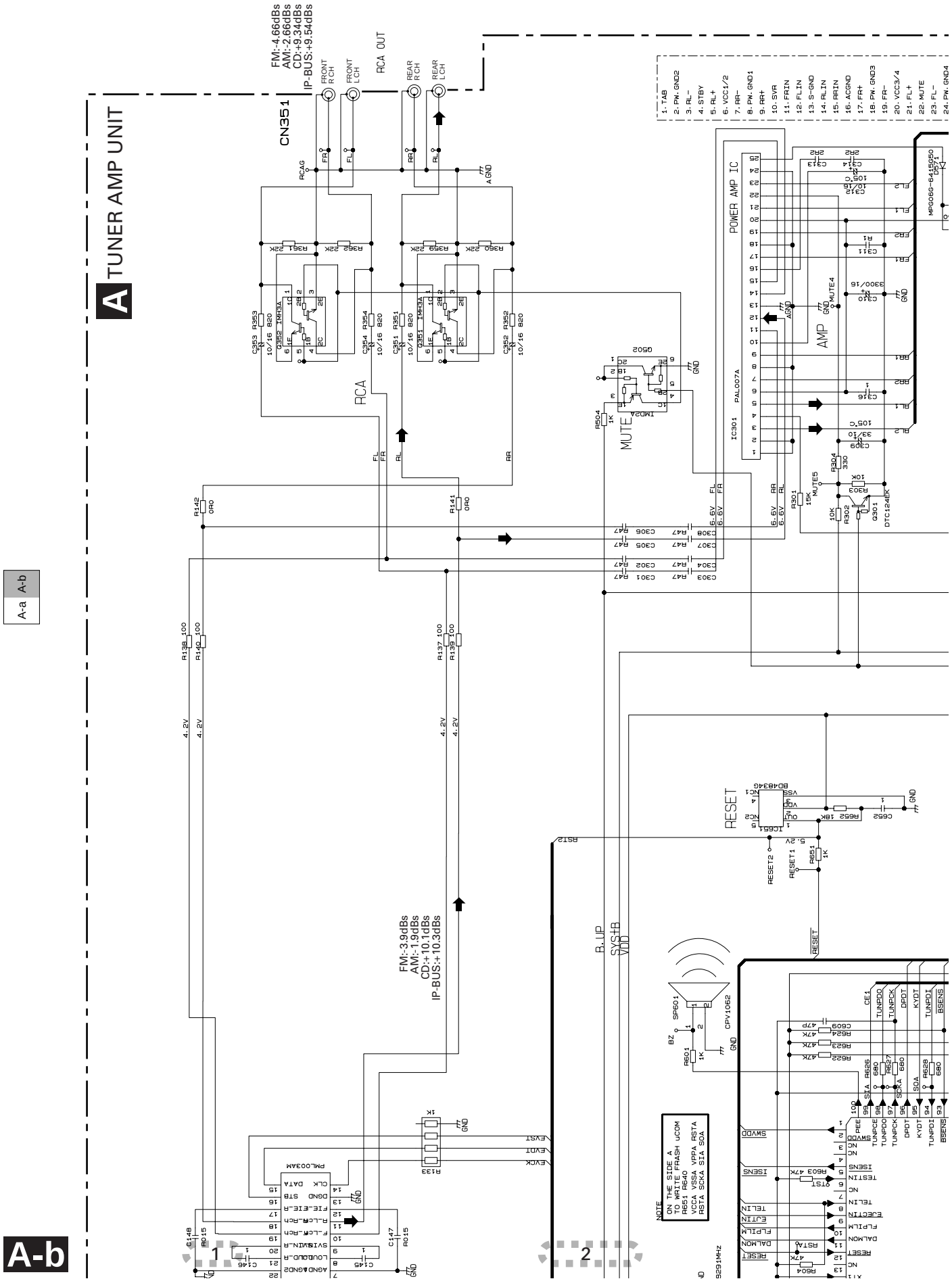
- Symbol indicates a resistor.
  No differentiation is made between chip resistors and discrete resistors.
- Symbol indicates a capacitor.
  No differentiation is made between chip capacitors and discrete capacitors.

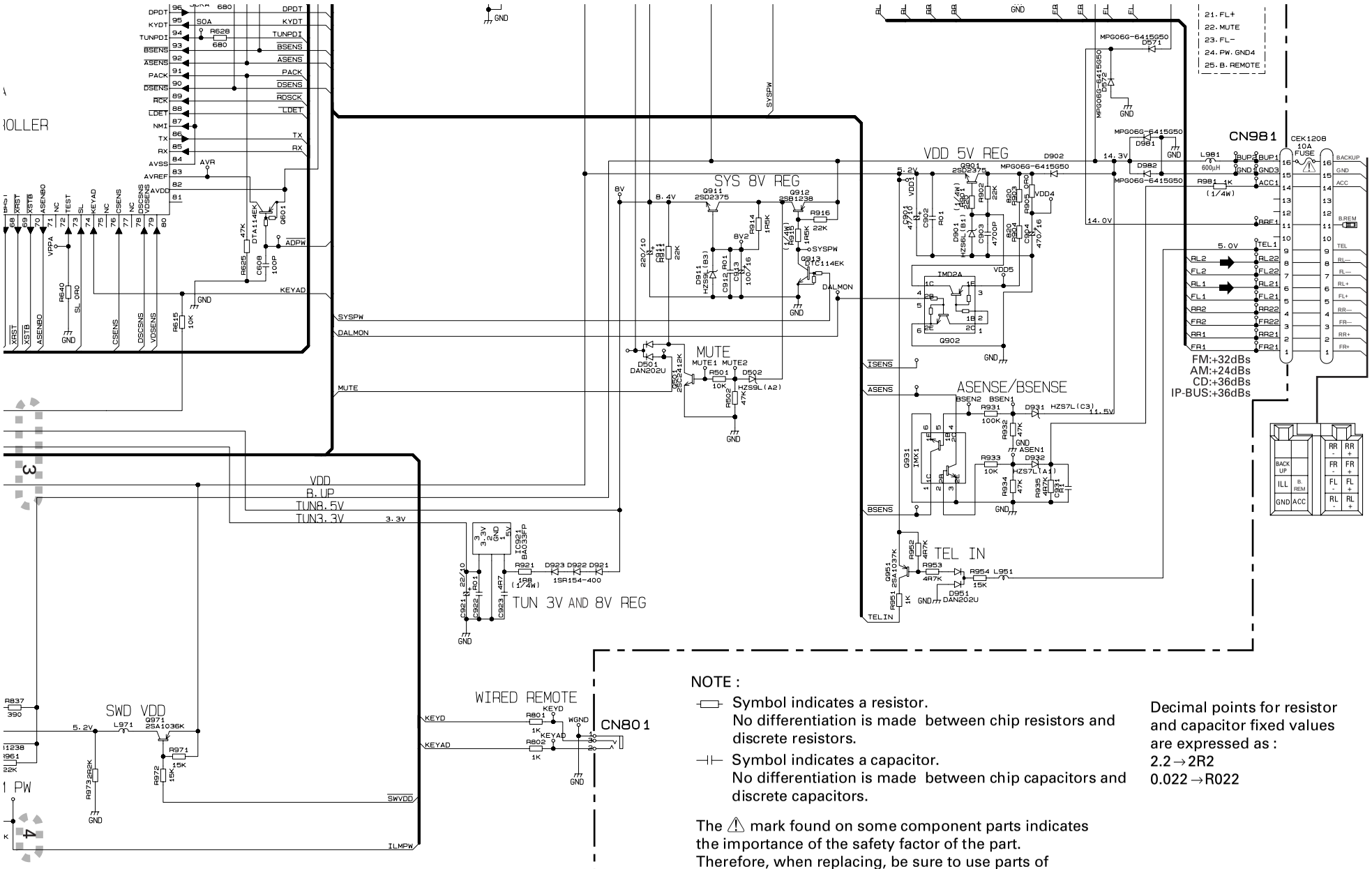
The ⚠ mark found on some component parts indicates the importance of the safety factor of the part.
Therefore, when replacing, be sure to use parts of identical designation.

Decimal points for resistor and capacitor fixed values are expressed as :
2.2→2R2
0.022→R022


A-b
A-a
A-b
A-a
CD CORE UNIT(S10MP3)
CN901
CN721
CN101
IP-BUS DRIVER
IP-BUS:+2.2dBs
FM:-27.0dBs
AM:-27.0dBs
CD:0dBs
IP-BUS:+2.2dBs
CD:0dBs
MECHA VD
EVOL
B.UP
VDD
SYS+B
BUSR-
BUSR+
TUNR
CDR
CDL
TUNL
BUSL+
BUSL-
IP-BUS


IC601
PE5338A
SYSTEM CONTROLLER
DETACH SENSE
GRILL
ILM PW
CN831
CN1950
CN1951
CN1901
PANEL UNIT
KEYBOARD UNIT
EJECT
TUNER
FM/AM TUNER UNIT
FM(30%):-26.0dBs
AM(30%):-26.0dBs
CN401
CN402
TUN5V2
TUN8.5V
TUN3.3V
A-b
A-a B


A TUNER AMP UNIT
CN351
FM:-4.66dBs
AM:-2.66dBs
CD:+9.34dBs
IP-BUS:+9.54dBs
RCA OUT
FRONT RCH
FRONT LCH
REAR RCH
REAR LCH
POWER AMP IC
IC301 PAL007A
AMP
MUTE
RCA
RESET
FM:-3.9dBs
AM:-1.9dBs
CD:+10.1dBs
IP-BUS:+10.3dBs
R.UP SYS+B VDD
A-b
A-a
1
2



NOTE :

- ⊐⊏ Symbol indicates a resistor. No differentiation is made between chip resistors and discrete resistors.
- ⊣⊢ Symbol indicates a capacitor. No differentiation is made between chip capacitors and discrete capacitors.

The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.

Decimal points for resistor and capacitor fixed values are expressed as :
2.2 → 2R2
0.022 → R022

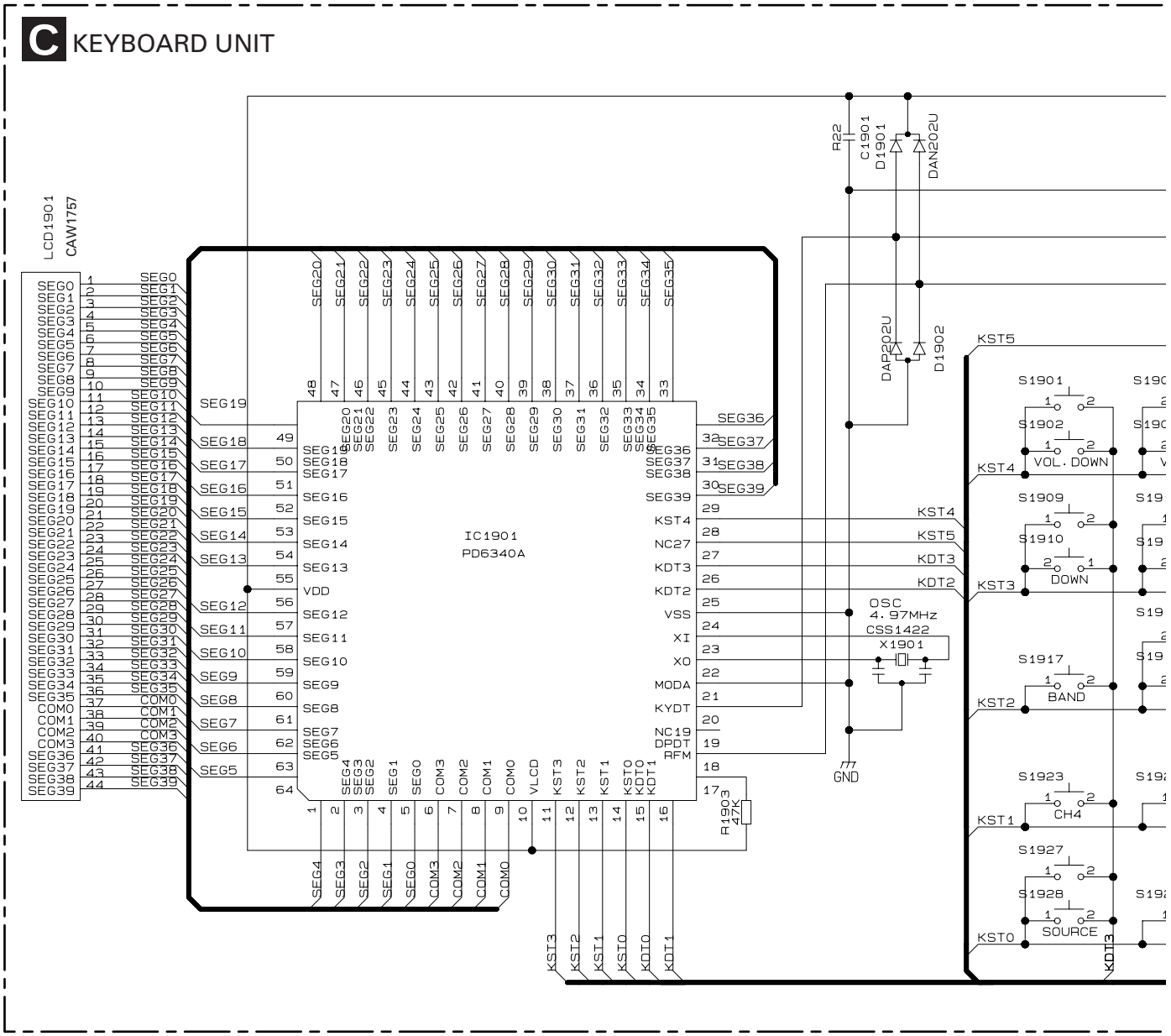
A-b

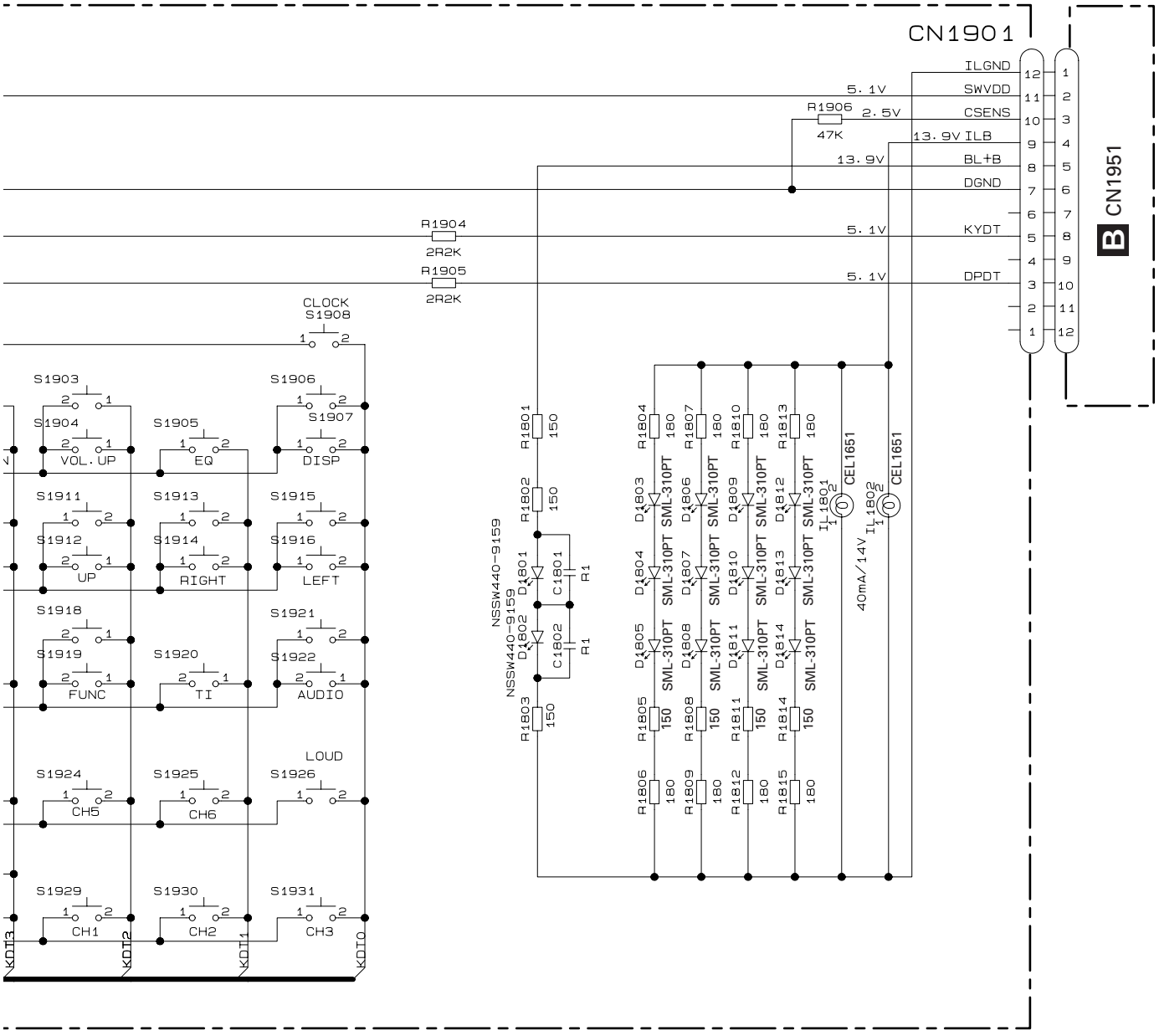
A-a | A-b

DEH-P3500MP/XM/EW

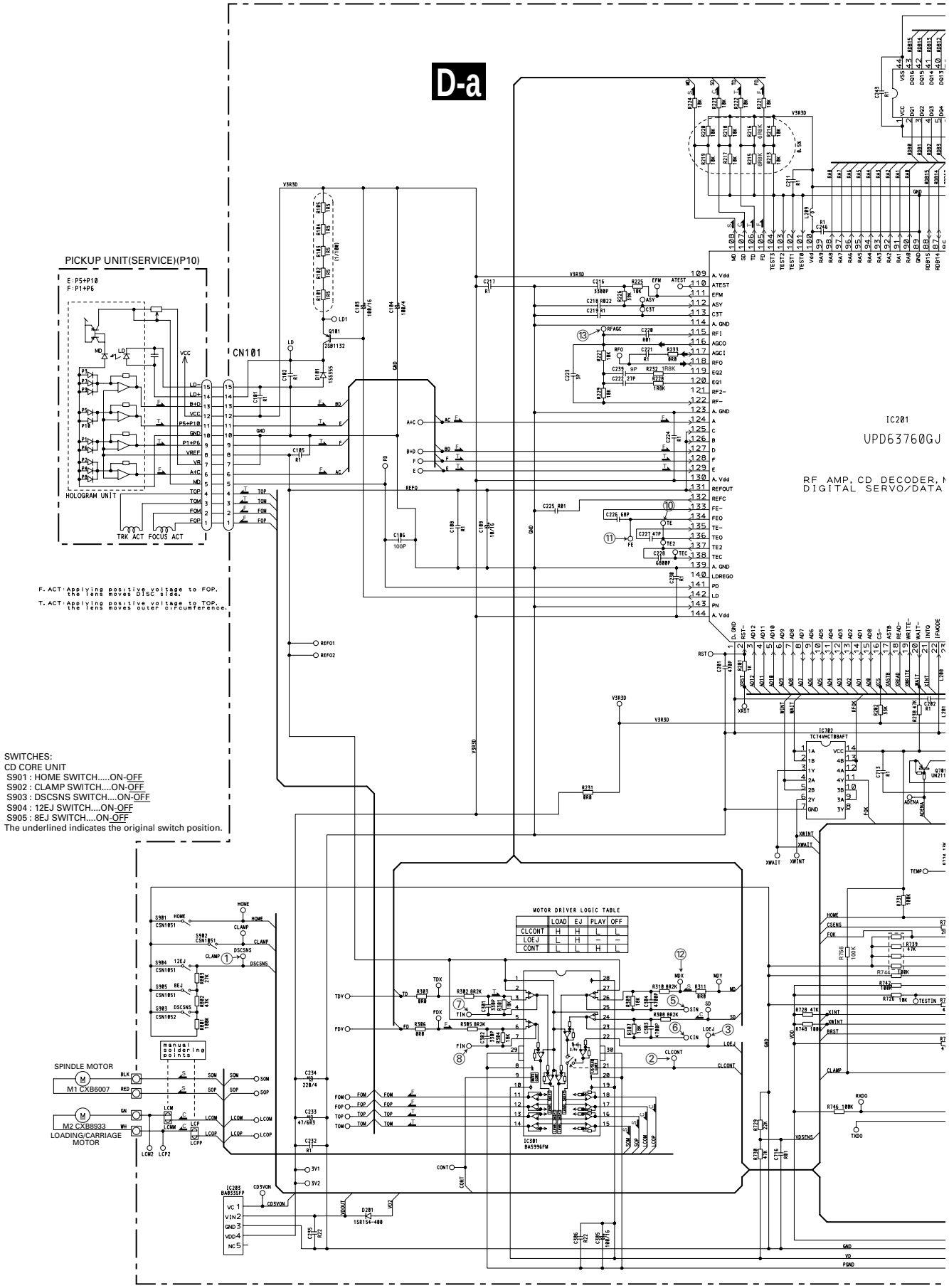
1G

3.3 KEYBOARD UNIT

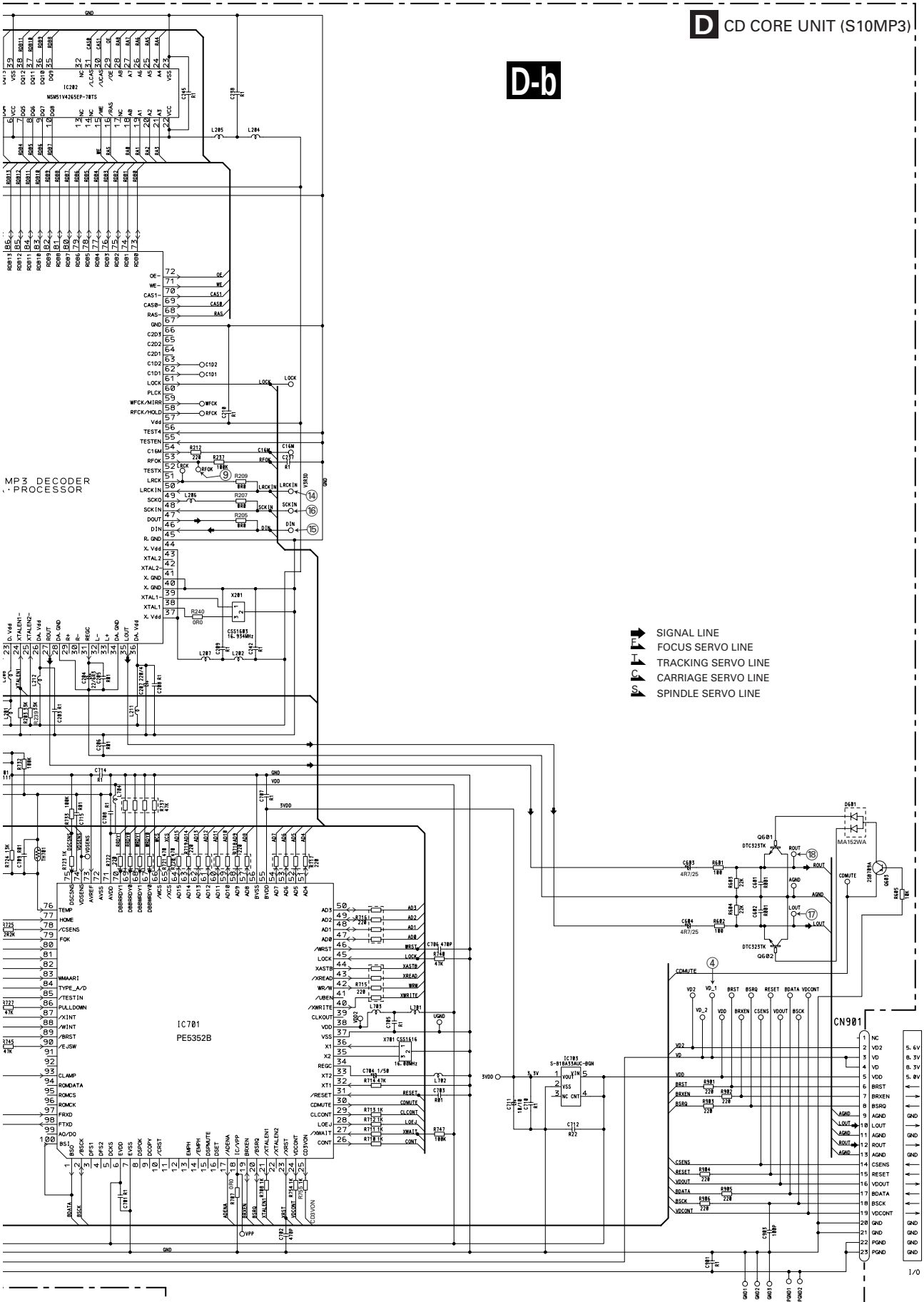


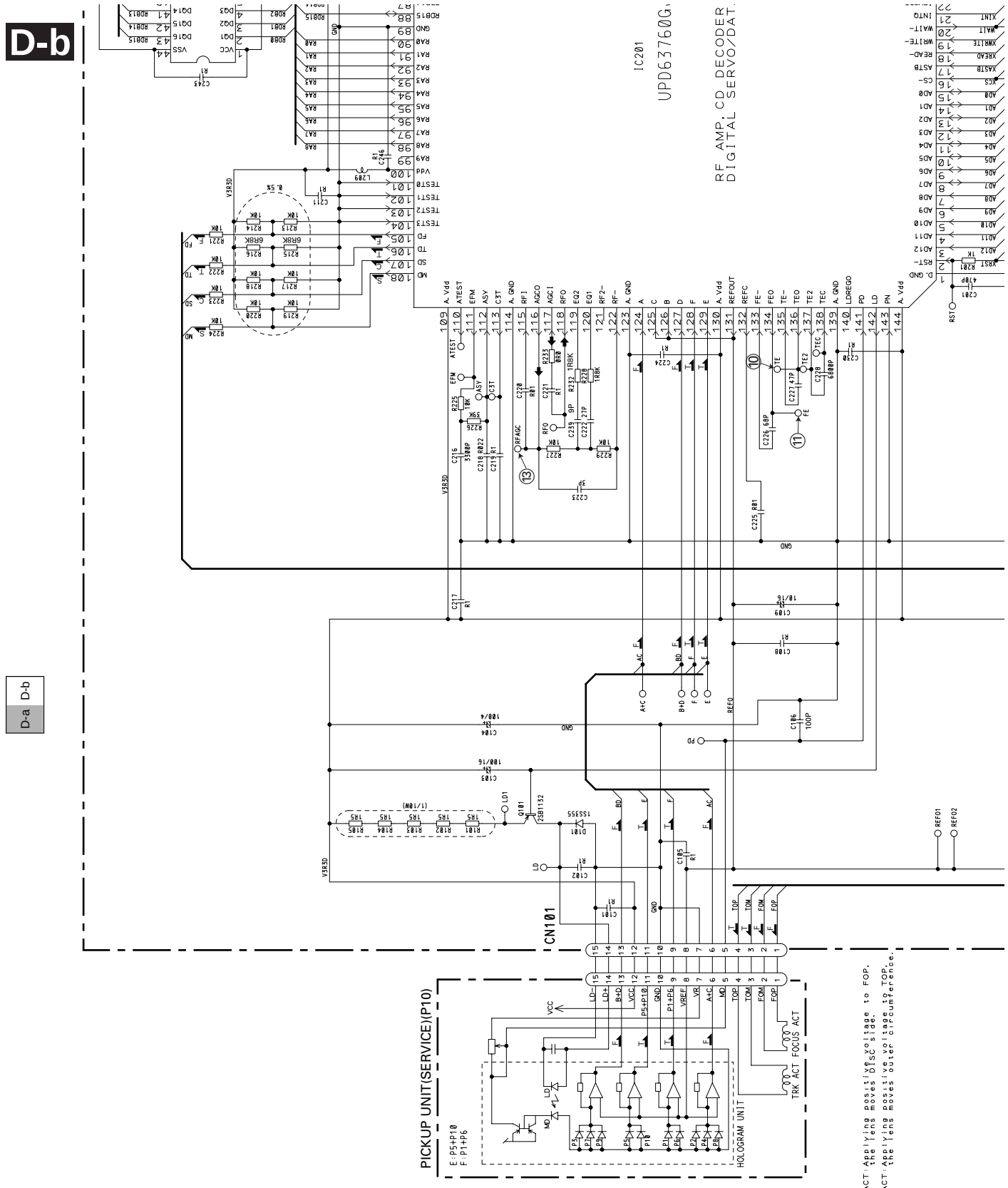

CN1901
ILGND
SWVDD
CSENS
ILB
BL+B
DGND
KYDT
DPDT
5.1V
2.5V
13.9V
R1906
47K
R1904
2R2K
R1905
2R2K
B CN1951
CLOCK
S1908
S1903
S1904
VOL. UP
S1905
EQ
S1906
S1907
DISP
S1911
S1912
UP
S1913
RIGHT
S1914
S1915
S1916
LEFT
S1918
S1919
FUNC
S1920
TI
S1921
S1922
AUDIO
LOUD
S1924
CH5
S1925
CH6
S1926
S1929
CH1
S1930
CH2
S1931
CH3
KOT3
KOT2
KOT1
KOT0
NSSW440-9159
D1801
D1802
R1801
R1802
R1803
150
C1801
C1802
R1
D1803
D1804
D1805
D1806
D1807
D1808
D1809
D1810
D1811
D1812
D1813
D1814
SML-310PT
R1804
R1805
R1806
R1807
R1808
R1809
R1810
R1811
R1812
R1813
R1814
R1815
180
IL1801
IL1802
CEL1651
40mA/14V

3.4 CD MECHANISM MODULE(GUIDE PAGE)



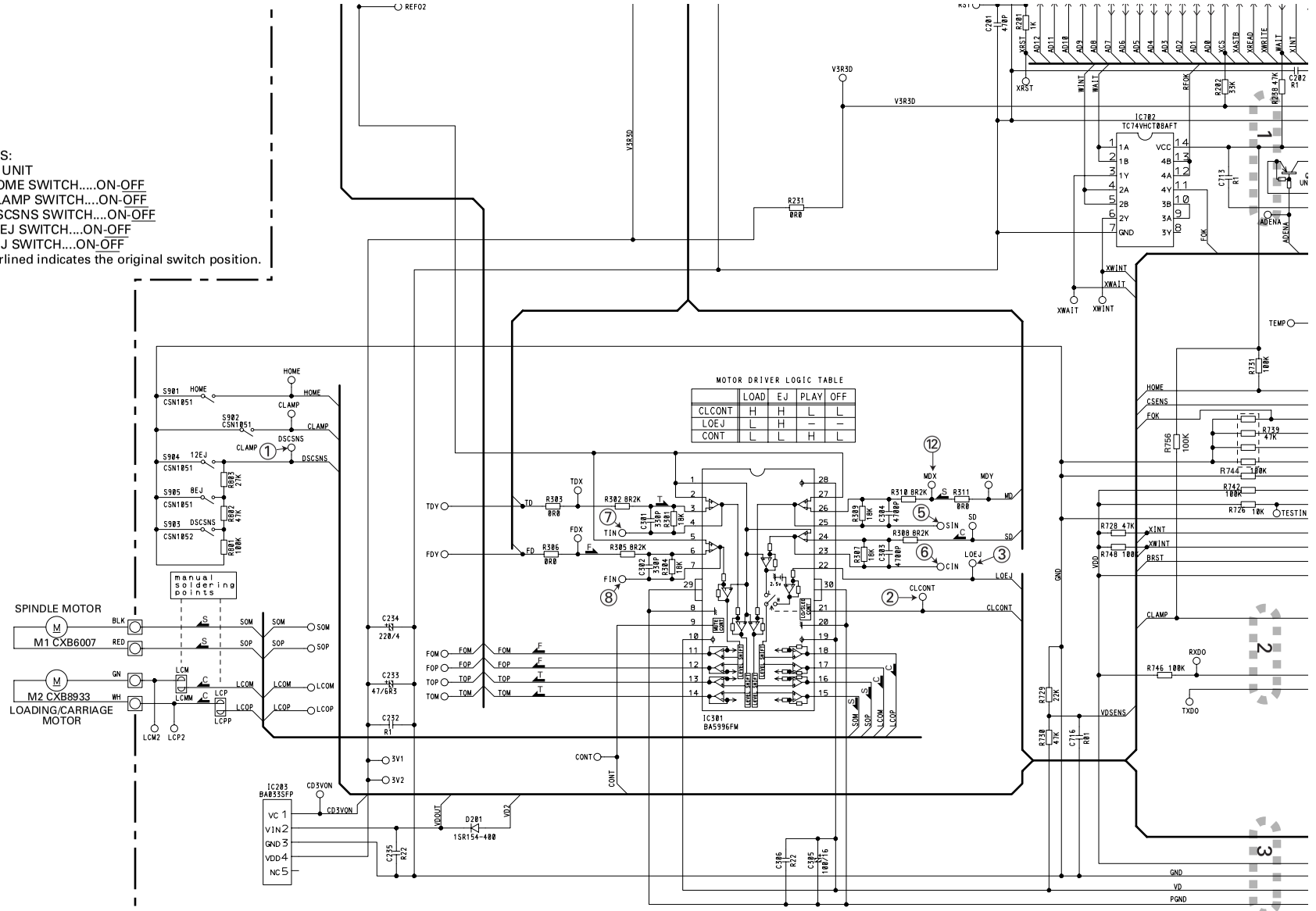
D-b


SIGNAL LINE
FOCUS SERVO LINE
TRACKING SERVO LINE
CARRIAGE SERVO LINE
SPINDLE SERVO LINE
MP3 DECODER PROCESSOR
IC701
PE5352B
IC202
MSM51V4265EP-70TS
CN901
CN721
MA152WA
DTC523TK
S-818BA31AUC-BGN


IC201
UPD63760G
RF AMP; CD DECODER
DIGITAL SERVO/DAT
CN101
PICKUP UNIT(SERVICE)(P10)
E:P5+P10
F:P1+P6
HOLOGRAM UNIT
F.ACT:Applying positive voltage to FOP.
the lens moves DISC side.
T.ACT:Applying positive voltage to TOP.
the lens moves outer circumference.

D-a D-b

SWITCHES:
CD CORE UNIT
S901 : HOME SWITCH.....ON-OFF
S902 : CLAMP SWITCH....ON-OFF
S903 : DSCSNS SWITCH....ON-OFF
S904 : 12EJ SWITCH....ON-OFF
S905 : 8EJ SWITCH....ON-OFF
The underlined indicates the original switch position.



NOTE1) GND ...CD LSI. RFAMP. CPU
PGND ...Actuator, Motor Driver
AGND ...Audio
These GND's are not connected to each other on PCB.
PGND is connected to a floating mechanism part by a screw.

NOTE2) This schematic applies to CNP6884-

D-a D-b

A

B

C

D

E

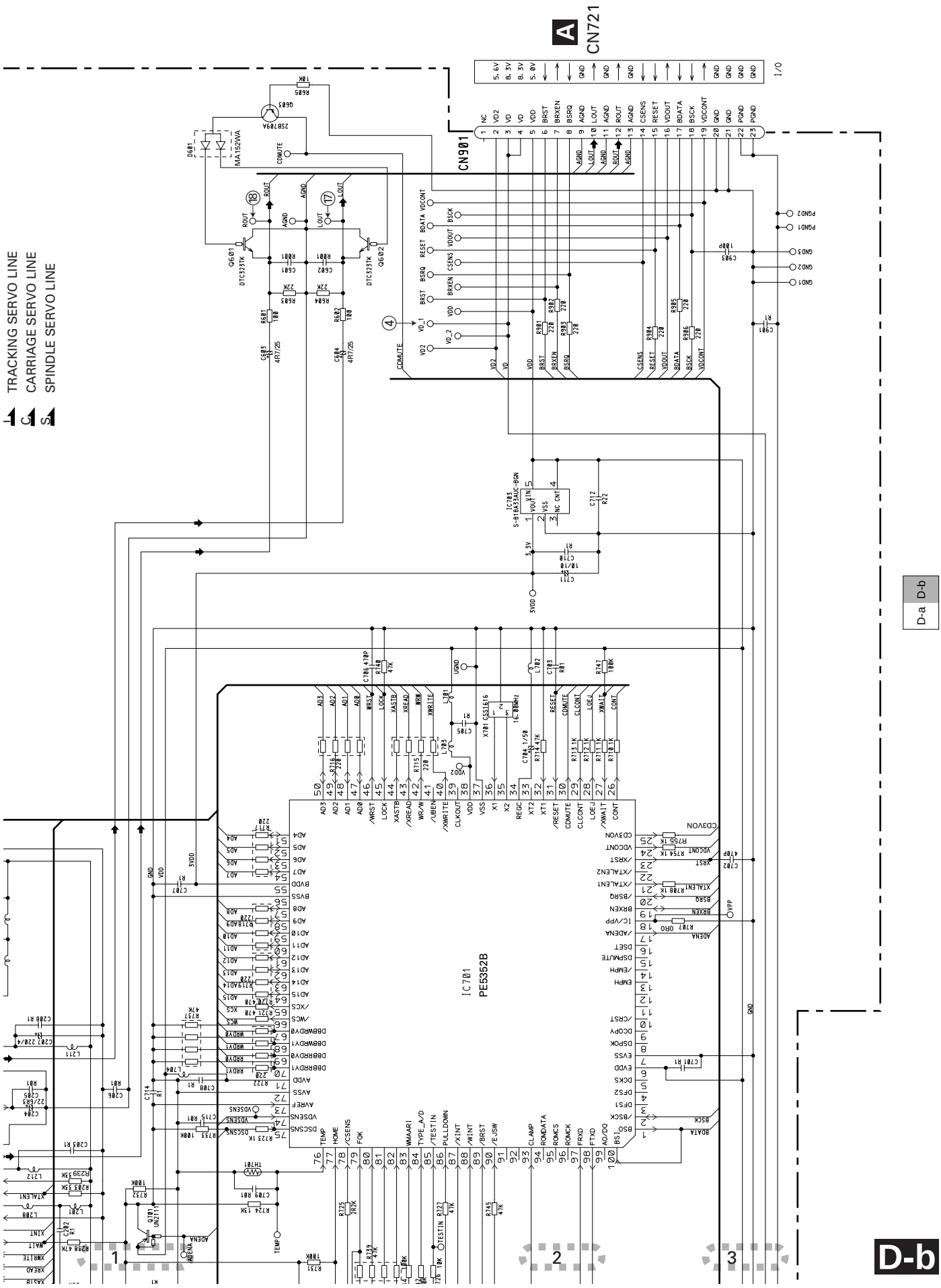
F

D CD CORE UNIT (S10MP3)

SIGNAL LINE
FOCUS SERVO LINE
TRACKING SERVO LINE
CARRIAGE SERVO LINE
SPINDLE SERVO LINE

D-a D-b

D-b


A
CN721
I/O
5. 6V
8. 3V
8. 3V
5. 0V
GND
CN901
NC
VD2
VD
VD
VDD
BRST
BRXEN
BSRQ
AGND
LOUT
AGND
ROUT
AGND
CSENS
RESET
VDOUT
BDATA
BSCK
VDCONT
GND
GND
GND
PGND
PGND
TRACKING SERVO LINE
CARRIAGE SERVO LINE
SPINDLE SERVO LINE
IC701
PE5352B
IC703
S-818A33AUC-BGN
CN701
GS1616
16.00MHz
D-a
D-b
D-b
1
2
3

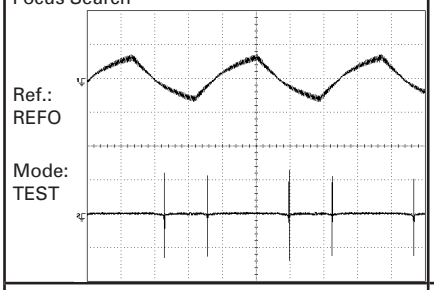
● Waveforms

Note : 1. The encircled numbers denote measuring points in the circuit diagram.
2. Reference voltage REFO1(1.65V)

① DSCSNS 5V/div 500ms/div ② CLCONT 5V/div ③ LOEJ 5V/div ④ VD 10V/div When loading a 12cm CD Ref.: GND Mode: Normal	① DSCSNS 5V/div 500ms/div ② CLCONT 5V/div ③ LOEJ 5V/div ④ VD 10V/div When loading an 8cm CD Ref.: GND Mode: Normal	⑤ SIN 1V/div 2s/div ⑥ CIN 500mV/div ⑦ TIN 500mV/div When setting up after loading a 12cm CD-DA disc Ref.: REFO Mode: Normal
⑤ SIN 1V/div 2s/div ⑥ CIN 500mV/div ⑦ TIN 500mV/div When setting up after loading a 12cm CD-ROM disc(1 session) Ref.: REFO Mode: Normal	⑤ SIN 1V/div 2s/div ⑥ CIN 500mV/div ⑦ TIN 500mV/div When setting up after loading a 12cm CD-ROM disc(3 session) Ref.: REFO Mode: Normal	⑧ FIN 200mV/div 500ms/div ⑨ RFOK 2V/div ⑤ SIN 2V/div When setting up "Source On"(12cm CD-DA) Ref.: REFO Mode: Normal
⑩ TE 500mV/div 200ms/div ⑪ FE 500mV/div When setting up "Source On" Ref.: REFO Mode: Normal	⑪ FE 500mV/div 20ms/div ⑧ FIN 500mV/div ⑩ TE 500mV/div ⑦ TIN 500mV/div During "Play"(CD-DA) Ref.: REFO Mode: Normal	⑪ FE 500mV/div 20ms/div ⑧ FIN 500mV/div ⑩ TE 500mV/div ⑦ TIN 500mV/div During "Play"(CD-ROM)(Track Jump is generated periodically)(Refer to Track Jump waveform) Ref.: REFO Mode: Normal
⑫ MDX 500mV/div 50ms/div ⑤ SIN 200mV/div Spindle waveform during "Play" Ref.: REFO Mode: Normal	⑫ MDX 500mV/div 5µs/div ⑤ SIN 1V/div Spindle waveform during "Play"(Magnified) Ref.: REFO Mode: Normal	⑬ RFAGC 500mV/div 5µs/div RF eye pattern Ref.: REFO Mode: Normal

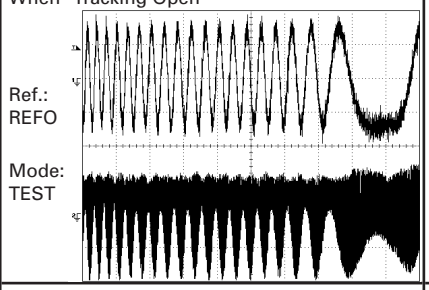
⑧ FIN 500mV/div 200ms/div
⑪ FE 500mV/div

Focus Search



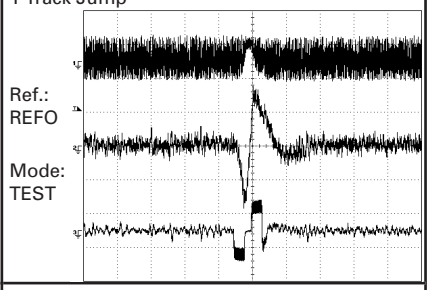
⑩ TE 500mV/div 2ms/div
⑬ RFAGC 500mV/div

When "Tracking Open"



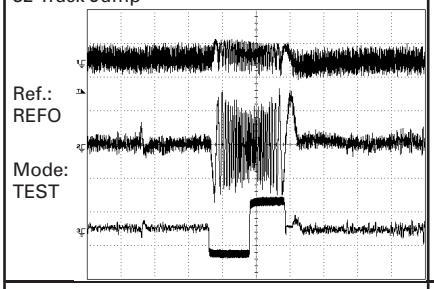
⑬ RFAGC 1V/div 500µs/div
⑩ TE 500mV/div
⑦ TIN 500mV/div

1 Track Jump



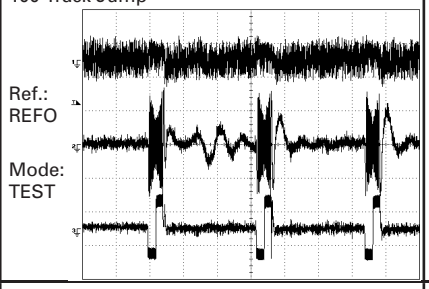
⑬ RFAGC 1V/div 1ms/div
⑩ TE 500mV/div
⑦ TIN 500mV/div

32 Track Jump



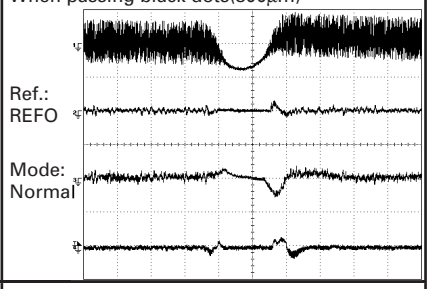
⑬ RFAGC 1V/div 5ms/div
⑩ TE 500mV/div
⑦ TIN 500mV/div

100 Track Jump



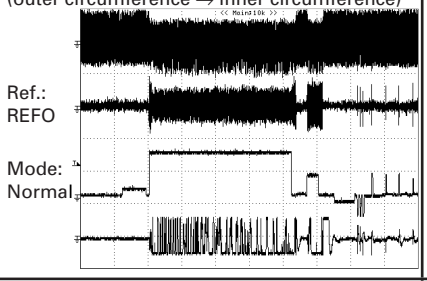
⑬ RFAGC 1V/div 500µs/div
⑦ TIN 1V/div
⑩ TE 1V/div
⑧ FIN 1V/div

When passing black dots(800µm)



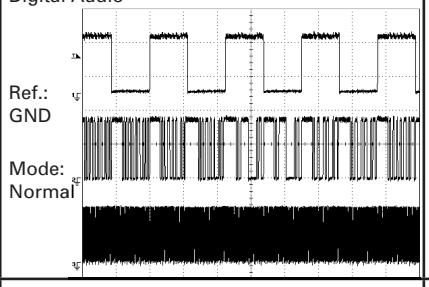
⑬ RFAGC 1V/div 200ms/div
⑮ TE 1V/div
⑥ CIN 500mV/div
⑤ SIN 2V/div

During inside/outside search
(outer circumference → inner circumference)



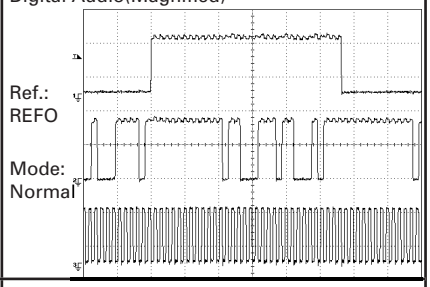
⑭ LRCKIN 2V/div 10µs/div
⑮ DIN 2V/div
⑯ SCKIN 2V/div

Digital Audio



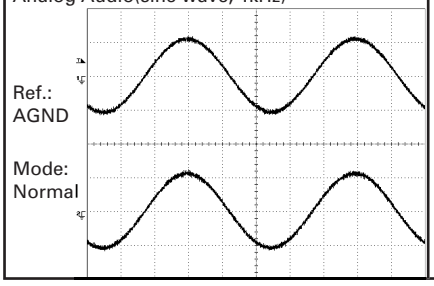
⑭ LRCKIN 2V/div 2µs/div
⑮ DIN 2V/div
⑯ SCKIN 2V/div

Digital Audio(Magnified)



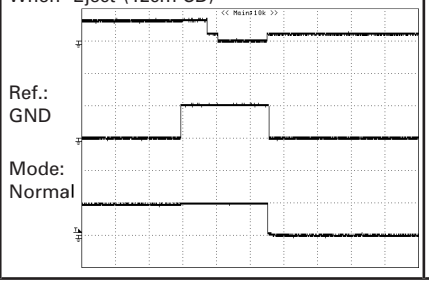
⑰ LOUT 1V/div 200µs/div
⑱ ROUT 1V/div

Analog Audio(sine wave, 1kHz)



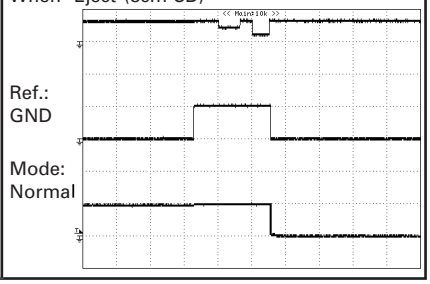
① DSCSNS 5V/div 500ms/div
② CLCONT 5V/div
③ LOEJ 5V/div

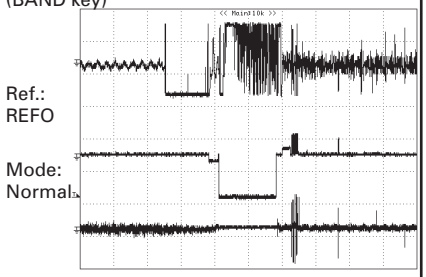
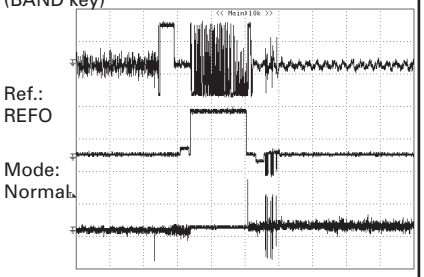
When "Eject"(12cm CD)



① DSCSNS 5V/div 10µs/div
② CLCONT 5V/div
③ LOEJ 5V/div

When "Eject"(8cm CD)



⑤ SIN 1V/div 500ms/div ⑥ CIN 500mV/div ⑦ TIN 500mV/div When switching to CD-ROM from CD-DA (BAND key)  	⑤ SIN 1V/div 500ms/div ⑥ CIN 500mV/div ⑦ TIN 500mV/div When switching to CD-DA from CD-ROM (BAND key)  	

A

B

C

D

E

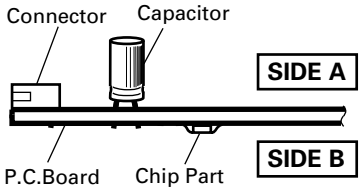
F

4. PCB CONNECTION DIAGRAM

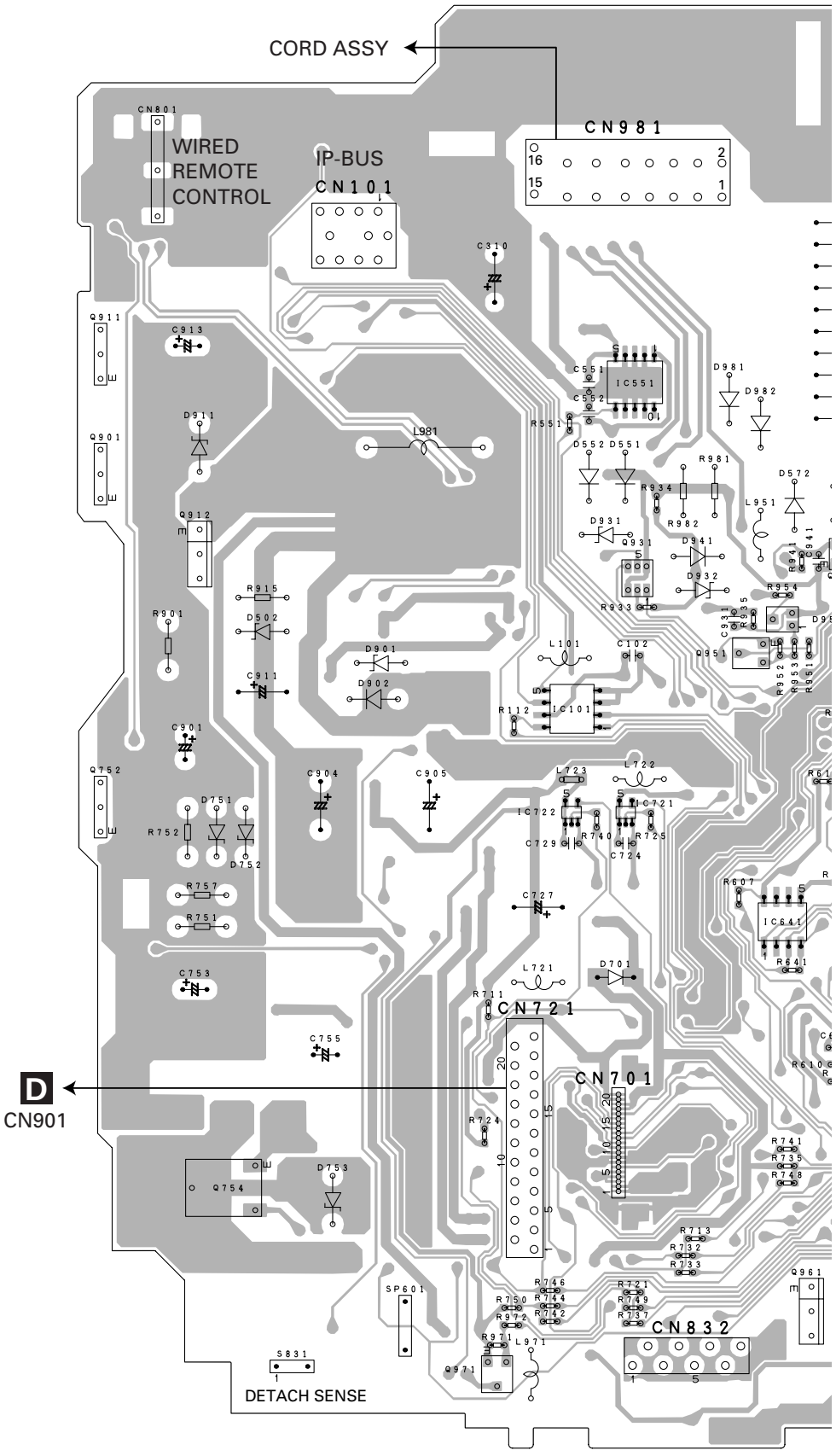
4.1 TUNER AMP UNIT

NOTE FOR PCB DIAGRAMS

1. The parts mounted on this PCB include all necessary parts for several destination.
   For further information for respective destinations, be sure to check with the schematic diagram.
2. Viewpoint of PCB diagrams

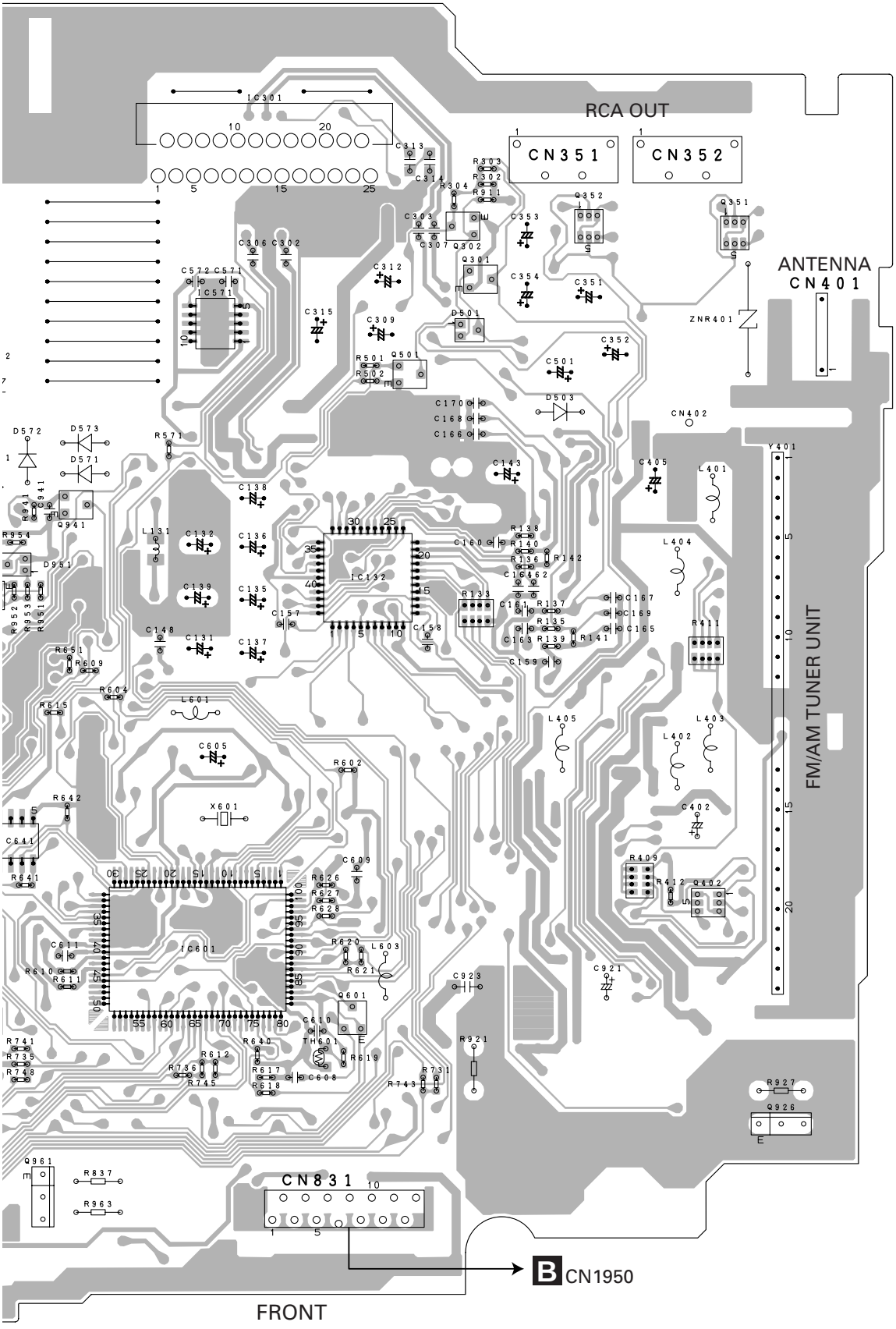


A TUNER AMP UNIT



A

SIDE A



IC,Q

IC301
Q352
Q351
Q302
Q301
Q911 IC571
IC551
Q501
Q901
Q912
Q931
Q941
IC132
Q951
IC101
Q752
IC721
IC722
IC641
Q402
IC601
Q601
Q754
Q926
Q961
Q971

A

A

B

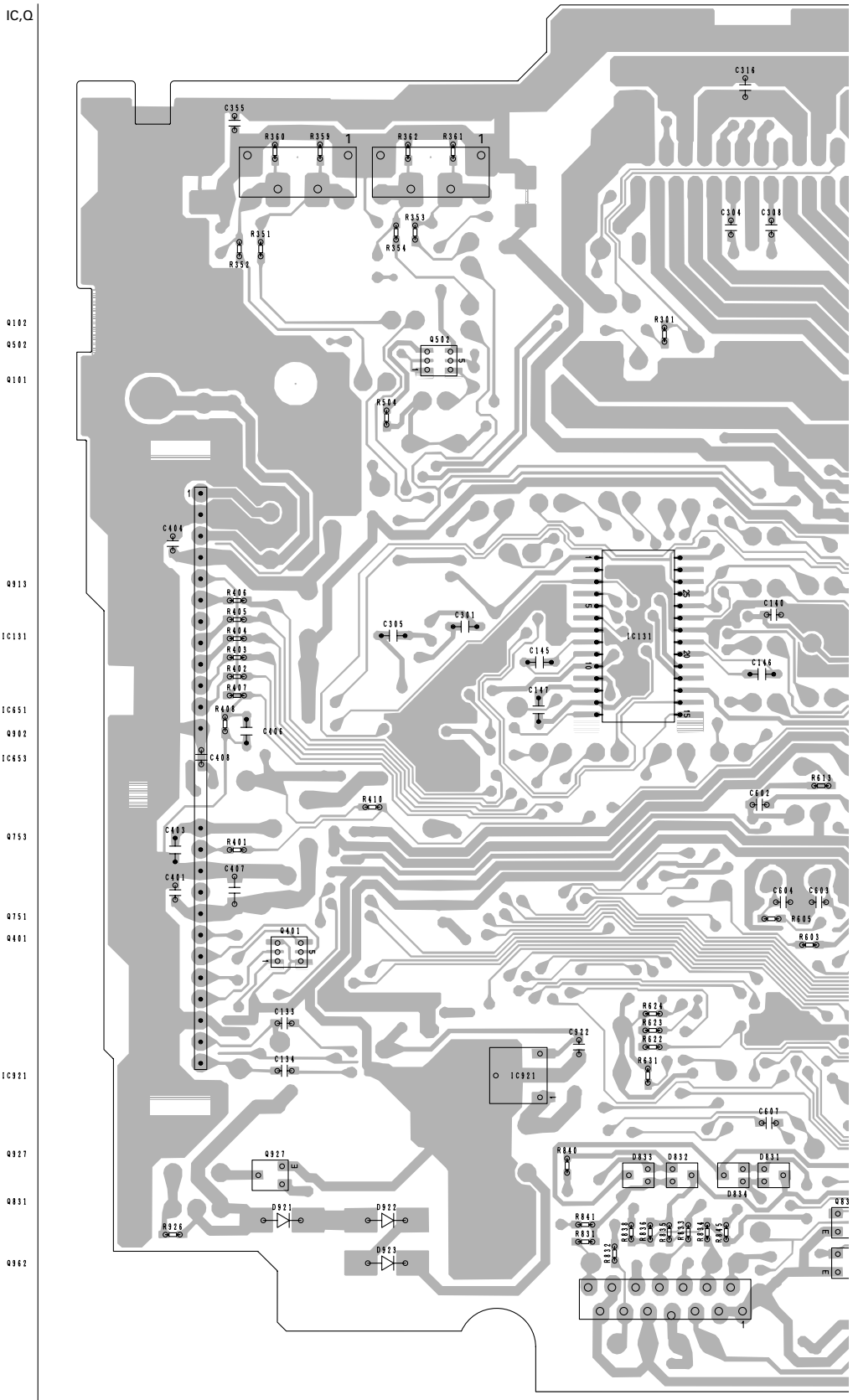
C

D

E

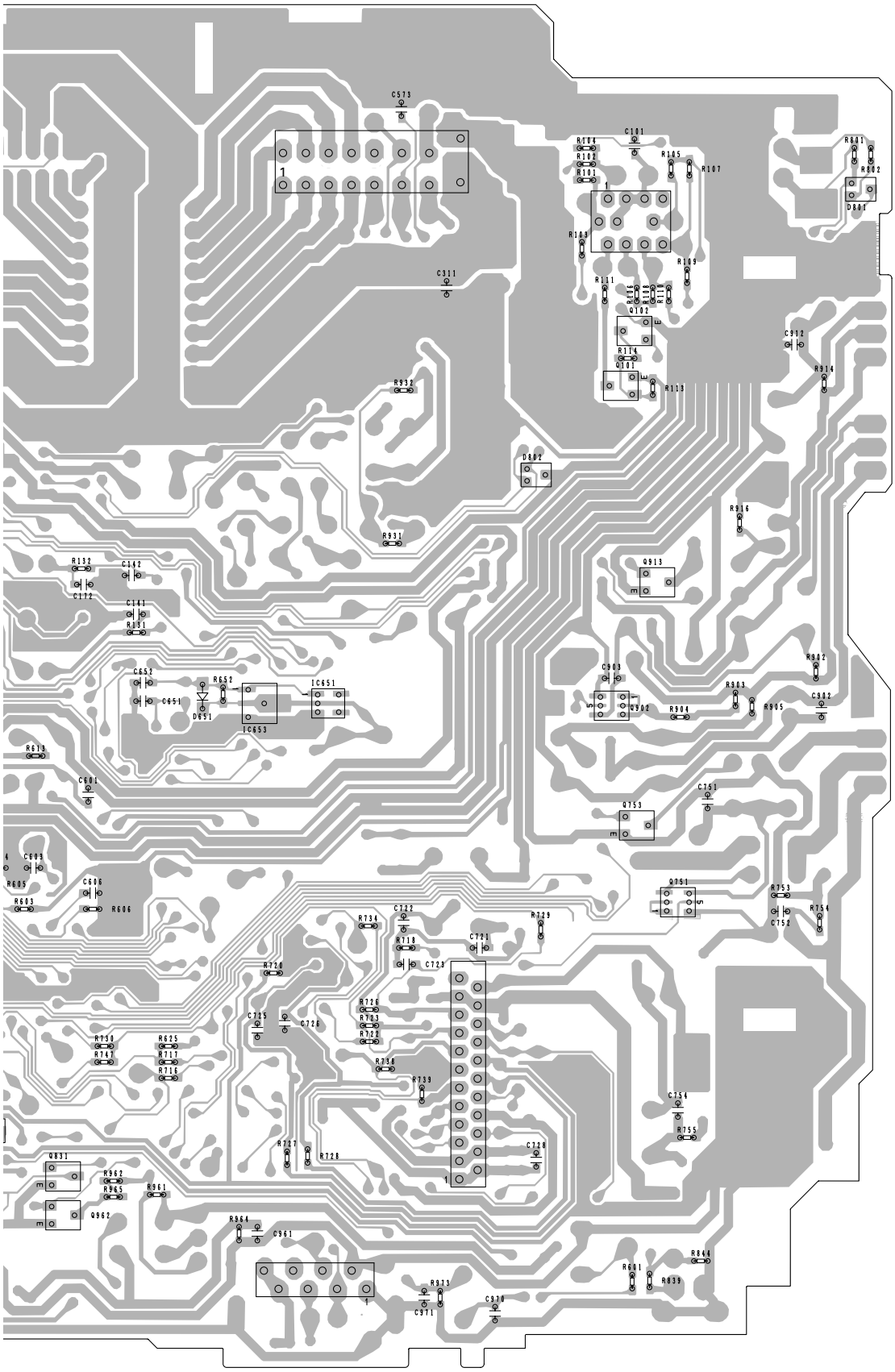
F

A TUNER AMP UNIT



A

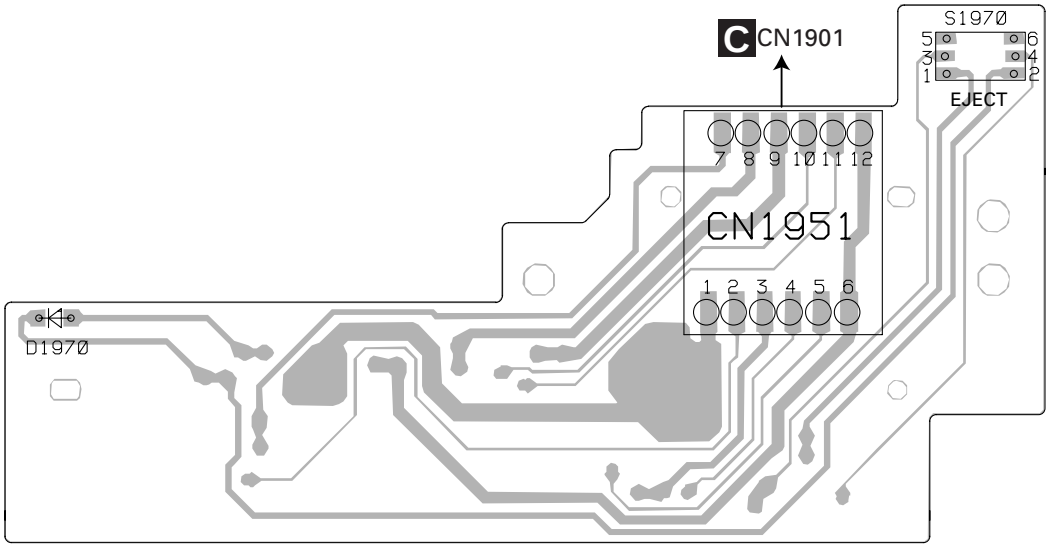
SIDE B



4.2 PANEL UNIT

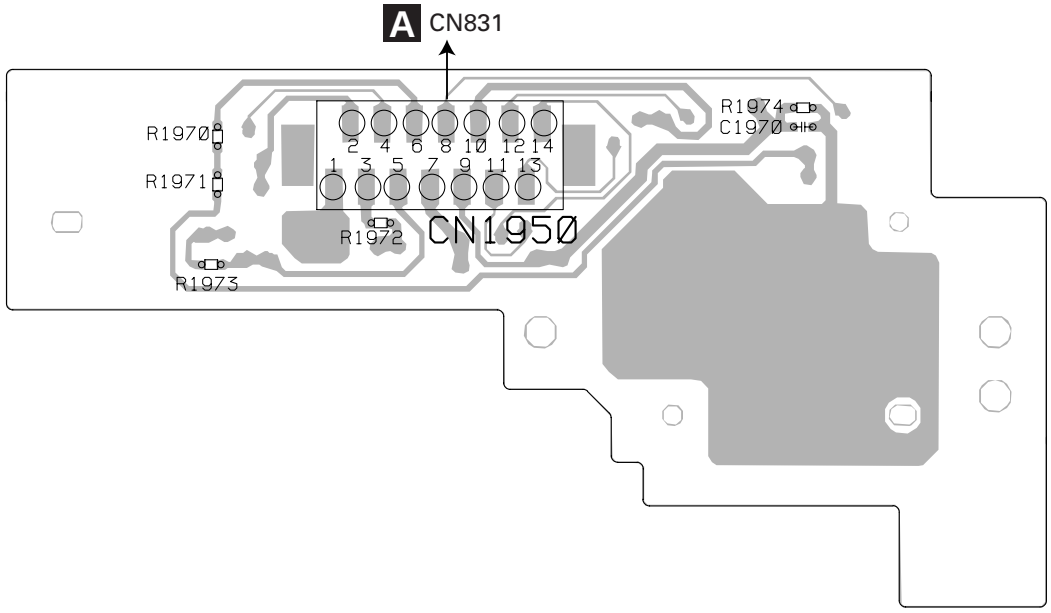
B PANEL UNIT

SIDE A



B PANEL UNIT

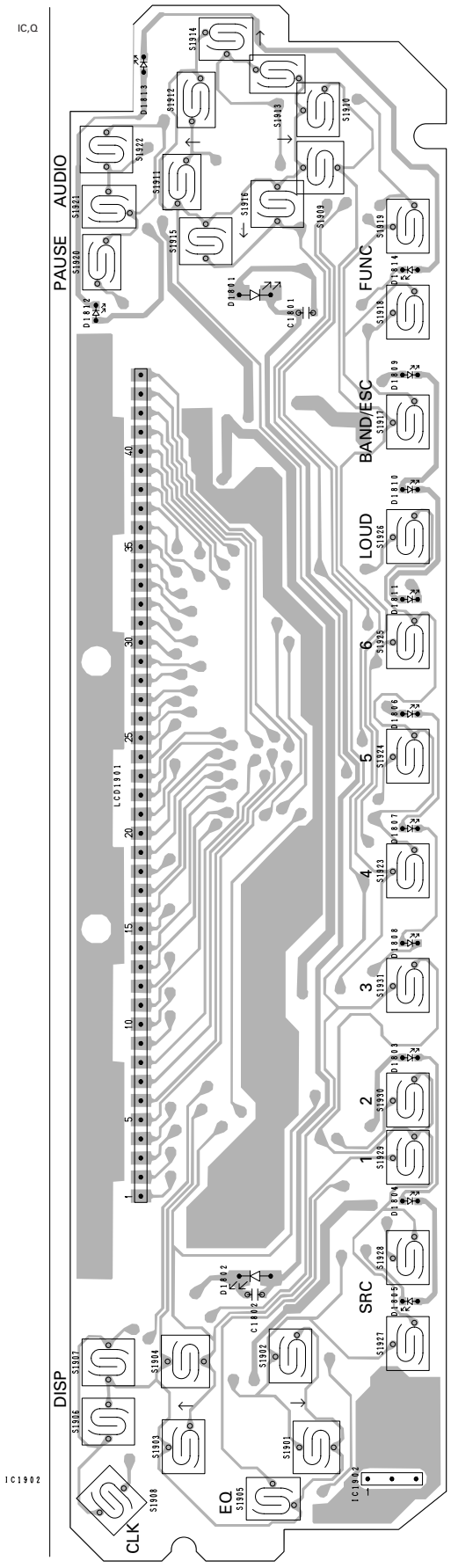
SIDE B



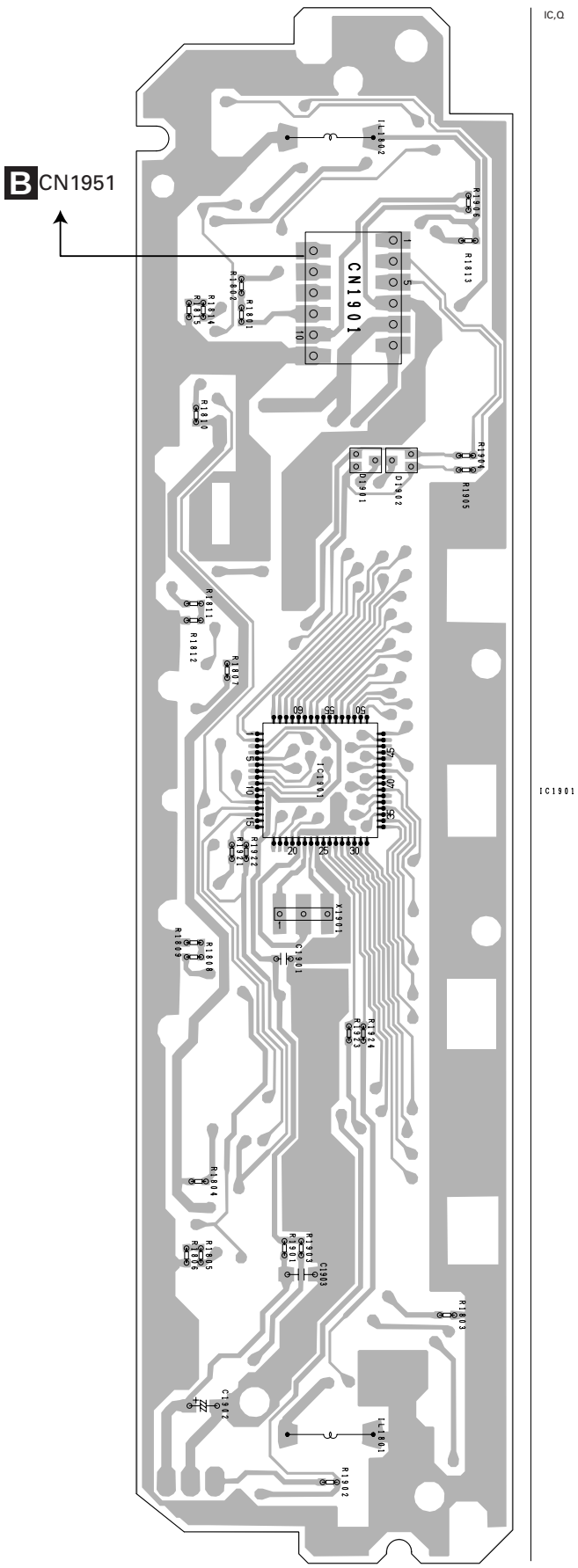
B

4.3 KEYBOARD UNIT

C KEYBOARD UNIT **SIDE A**



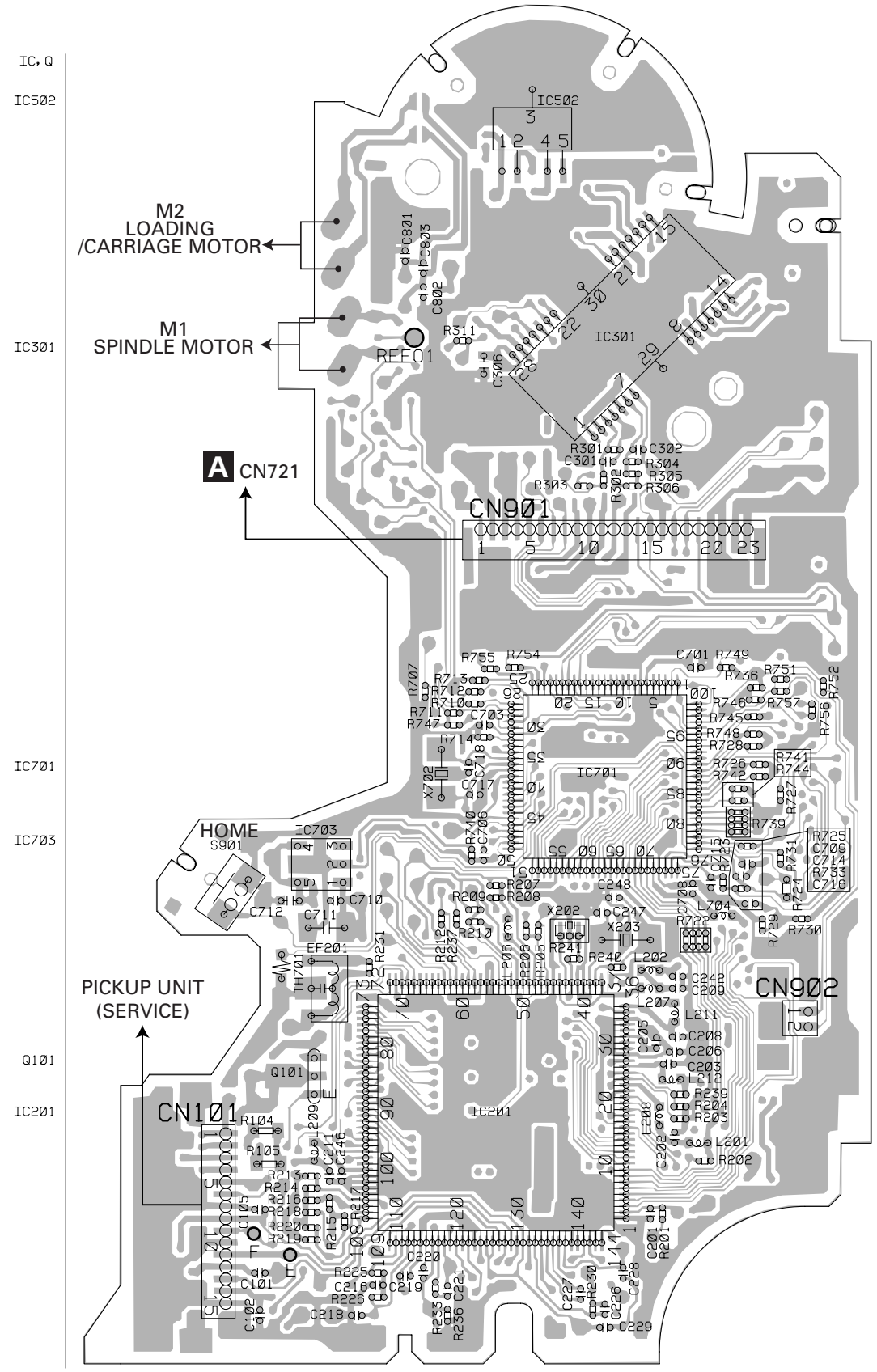
C KEYBOARD UNIT **SIDE B**



4.4 CD MECHANISM MODULE

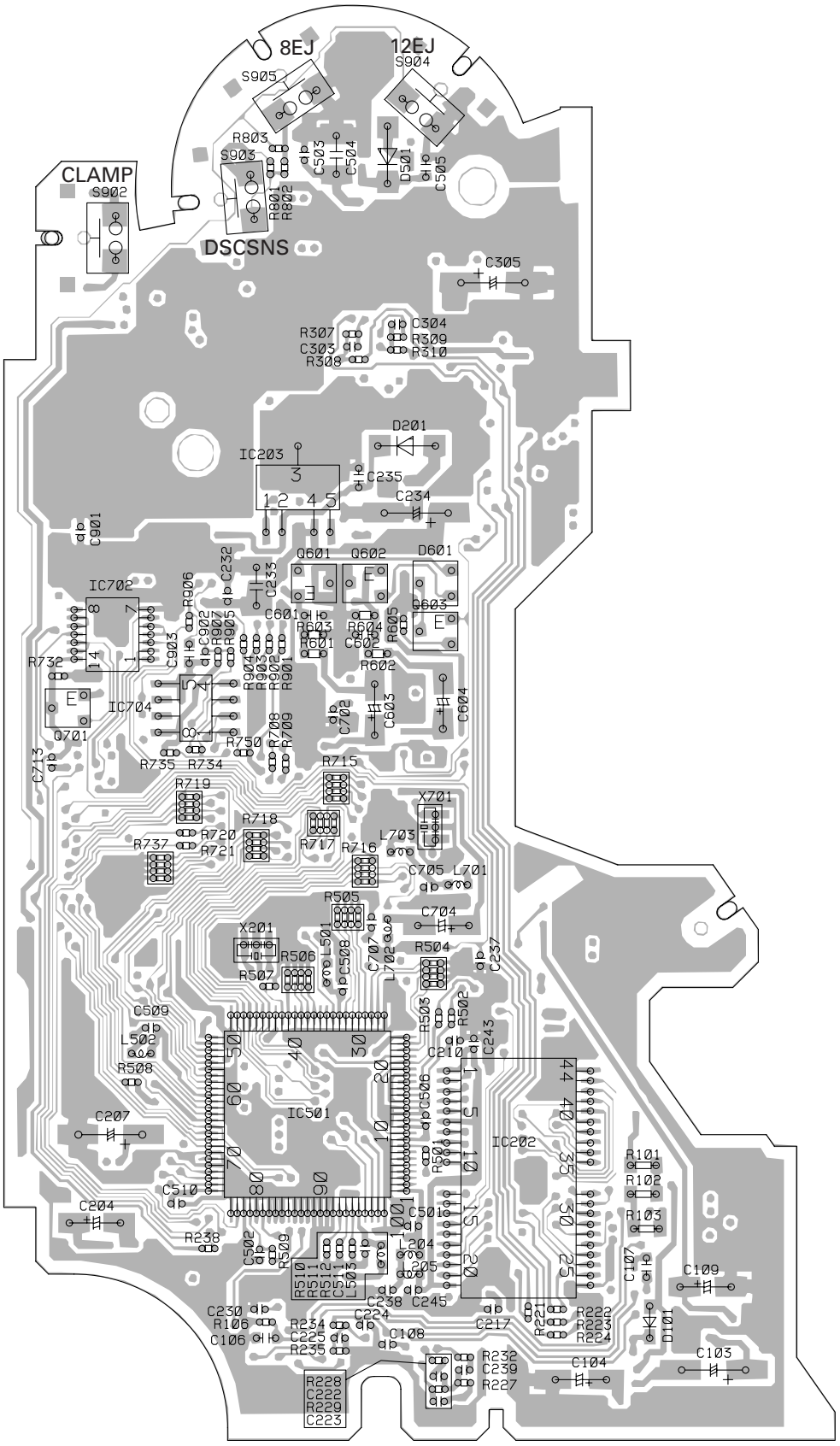
D CD CORE UNIT(S10MP3)

SIDE A



D CD CORE UNIT(S10MP3)

SIDE B



IC, Q

IC203

Q601 Q602
IC702
Q603

IC704
Q701

IC501
IC202

5. ELECTRICAL PARTS LIST

NOTES:

- Parts whose parts numbers are omitted are subject to being not supplied.
- The part numbers shown below indicate chip components.

Chip Resistor

RS1/○S○○○J,RS1/○○S○○○J

Chip Capacitor (except for CQS.....)

CKS....., CCS....., CSZS.....

A Unit Number : CWM8652
Unit Name : Tuner Amp Unit

MISCELLANEOUS

=====Circuit Symbol and No.		===Part Name	Part No.
IC	101	IC	HA12187FP
IC	131	IC	PML003AM
IC	301	IC	PAL007A
IC	601	IC	PE5338A
IC	651	IC	BD4834G
IC	921	IC	BA033FP
Q	101	Transistor	2SA1037K
Q	102	Transistor	DTC124EK
Q	301	Transistor	DTC124EK
Q	351	Transistor	IMH3A
Q	352	Transistor	IMH3A
Q	401	Transistor	IMH1A
Q	402	Transistor	IMH1A
Q	501	Transistor	2SC2412K
Q	502	Transistor	IMD2A
Q	601	Transistor	DTA114EK
Q	751	Transistor	IMD2A
Q	752	Transistor	2SD2375
Q	754	Transistor	2SD1760F5
Q	831	Transistor	DTC143EK
Q	901	Transistor	2SD2375
Q	902	Transistor	IMD2A
Q	911	Transistor	2SD2375
Q	912	Transistor	2SB1238
Q	913	Transistor	DTC114EK
Q	931	Transistor	IMX1
Q	951	Transistor	2SA1037K
Q	961	Transistor	2SB1238
Q	962	Transistor	DTC114EK
Q	971	Transistor	2SA1036K
D	501	Diode	DAN202U
D	502	Diode	HZS9L(A2)
D	571	Diode	MPG06G-6415G50
D	572	Diode	MPG06G-6415G50
D	751	Diode	HZS9L(B1)
D	753	Diode	HZS6L(C1)
D	831	Diode	DAN202U
D	832	Diode	DAN202U
D	833	Diode	DAP202U
D	834	Diode	DAP202U
D	901	Diode	HZS6L(B1)
D	902	Diode	MPG06G-6415G50
D	911	Diode	HZS9L(B3)
D	921	Diode	1SR154-400
D	922	Diode	1SR154-400
D	923	Diode	1SR154-400
D	931	Diode	HZS7L(C3)
D	932	Diode	HZS7L(A1)
D	951	Diode	DAN202U
D	981	Diode	MPG06G-6415G50
D	982	Diode	MPG06G-6415G50
ZNR	401	Arrester	DSP-201M
L	101	Inductor	LAU2R2K
L	131	Inductor	LCTA2R2J2520
L	401	Ferri-Inductor	LAU4R7K
L	402	Inductor	LAU1R0K
L	403	Inductor	LAU2R2K
L	404	Inductor	LAU1R0K
L	601	Inductor	LAU2R2K
L	721	Inductor	LAU2R2K
L	951	Inductor	LAU2R2K
L	971	Inductor	LAU2R2K
L	981	Choke Coil 600µH	CTH1280
X	601	Radiator 12.58291MHz	CSS1402
S	831	Switch(DETACH SENSE)	CSN1039
SP	601	Buzzer	CPV1062
		FM/AM Tuner Unit	CWE1645

RESISTORS

R	101		RS1/16S150J
R	102		RS1/16S470J
R	103		RS1/16S101J
R	104		RS1/16S101J
R	105		RS1/16S181J
R	106		RS1/16S181J
R	107		RS1/16S223J
R	108		RS1/16S223J
R	109		RS1/16S102J
R	110		RS1/16S102J
R	111		RS1/16S222J
R	112		RS1/16S103J
R	113		RS1/16S332J
R	114		RS1/16S562J
R	131		RS1/16S471J
R	132		RS1/16S471J
R	133		RAB4C102J
R	137		RS1/16S101J
R	138		RS1/16S101J
R	139		RS1/16S101J
R	140		RS1/16S101J
R	141		RS1/16S0R0J
R	142		RS1/16S0R0J
R	301		RS1/16S153J
R	302		RS1/16S103J
R	303		RS1/16S103J
R	304		RS1/16S331J
R	351		RS1/16S821J
R	352		RS1/16S821J
R	353		RS1/16S821J
R	354		RS1/16S821J
R	359		RS1/16S223J
R	360		RS1/16S223J
R	361		RS1/16S223J
R	362		RS1/16S223J

=====Circuit Symbol and No.	===Part Name	Part No.
R 401		RS1/16S681J
R 402		RS1/16S681J
R 403		RS1/16S122J
R 404		RS1/16S681J
R 405		RS1/16S681J
R 406		RS1/16S681J
R 409		RAB4C223J
R 501		RS1/16S103J
R 502		RS1/16S473J
R 504		RS1/16S102J
R 601		RS1/16S102J
R 603		RS1/16S473J
R 604		RS1/16S473J
R 605		RS1/16S102J
R 606		RS1/16S473J
R 607		RS1/16S104J
R 609		RS1/16S103J
R 612		RS1/16S0R0J
R 615		RS1/16S103J
R 622		RS1/16S473J
R 623		RS1/16S473J
R 624		RS1/16S473J
R 625		RS1/16S473J
R 626		RS1/16S681J
R 627		RS1/16S681J
R 628		RS1/16S681J
R 640		RS1/16S0R0J
R 651		RS1/16S102J
R 652		RS1/16S183J
R 711		RS1/16S682J
R 718		RS1/16S473J
R 721		RS1/16S0R0J
R 722		RS1/16S682J
R 723		RS1/16S682J
R 724		RS1/16S682J
R 726		RS1/16S0R0J
R 727		RS1/16S821J
R 728		RS1/16S821J
R 734		RS1/16S102J
R 738		RS1/16S0R0J
R 739		RS1/16S0R0J
R 743		RS1/16S221J
R 744		RS1/16S221J
R 745		RS1/16S221J
R 746		RS1/16S221J
R 747		RS1/16S221J
R 748		RS1/16S221J
R 751		RD1/4PU821J
R 752		RD1/4PU221J
R 755		RS1/16S331J
R 757		RD1/4PU0R0J
R 801		RS1/16S102J
R 802		RS1/16S102J
R 831		RS1/16S222J
R 832		RS1/16S222J
R 833		RS1/16S222J
R 834		RS1/16S222J
R 835		RS1/16S473J
R 836		RS1/16S473J
R 837		RD1/4PU391J
R 838		RS1/16S102J
R 839		RS1/16S102J
R 840		RS1/16S102J
R 841		RS1/16S102J
R 845		RS1/16S102J

=====Circuit Symbol and No.	===Part Name	Part No.
R 901		RD1/4PU221J
R 902		RS1/16S223J
R 903		RS1/16S821J
R 904		RS1/16S821J
R 905		RS1/16S0R0J
R 911		RS1/16S223J
R 914		RS1/16S152J
R 915		RD1/4PU152J
R 916		RS1/16S223J
R 921		RD1/4PU1R8J
R 931		RS1/16S104J
R 932		RS1/16S473J
R 933		RS1/16S103J
R 934		RS1/16S473J
R 935		RS1/16S472J
R 951		RS1/16S102J
R 952		RS1/16S472J
R 953		RS1/16S472J
R 954		RS1/16S153J
R 961		RS1/16S223J
R 962		RS1/16S182J
R 963		RD1/4PU1R0J
R 965		RS1/16S182J
R 971		RS1/16S153J
R 972		RS1/16S153J
R 973		RS1/16S222J
R 981		RD1/4PU102J
R 9405		RD1/4PU0R0J

CAPACITORS

C 101		CKSRYB104K25
C 131		CEJQ1R0M50
C 132		CEJQ1R0M50
C 133		CKSRYB104K25
C 134		CKSRYB104K25
C 135		CEJQ1R0M50
C 136		CEJQ1R0M50
C 137		CEJQ1R0M50
C 138		CEJQ1R0M50
C 139		CEJQ470M16
C 140		CKSRYB104K25
C 141		CCSRCH102J25
C 143		CEJQ100M16
C 145		CKSRYB105K10
C 146		CKSRYB105K10
C 147		CKSRYB153K50
C 148		CKSRYB153K50
C 172		CCSRCH102J25
C 301		CKSRYB474K10
C 302		CKSRYB474K10
C 303		CKSRYB474K10
C 304		CKSRYB474K10
C 305		CKSRYB474K10
C 306		CKSRYB474K10
C 307		CKSRYB474K10
C 308		CKSRYB474K10
C 309		CEHAR330M10
C 310	3300µF/16V	CCH1486
C 311		CKSRYB104K25
C 312		CEHAR100M16
C 313		CKSQYB225K10
C 314		CKSQYB225K10
C 316		CKSQYB105K16
C 351		CEJQ100M16
C 352		CEJQ100M16

=====Circuit Symbol and No.	===	Part Name	Part No.
C	353		CEJQ100M16
C	354		CEJQ100M16
C	401		CKSRYB103K50
C	402		CEJQ470M6R3
C	403		CKSRYB103K50
C	404		CKSRYB103K50
C	405		CEJQ101M16
C	407		CKSYB475K10
C	601		CKSRYB473K50
C	602		CKSRYB105K10
C	603		CCSRCH200J50
C	604		CCSRCH200J50
C	605		CEJQ4R7M35
C	606		CKSRYB104K25
C	608		CCSRCH101J50
C	609		CCSRCH470J50
C	611		CKSRYB104K25
C	652		CKSRYB105K10
C	725		CCSRCH102J25
C	726		CCSRCH102J25
C	727	470µF/16V	CCH1331
C	751		CKSRYB224K10
C	752		CKSRYB102K50
C	753		CEJQ101M16
C	754		CKSRYB473K50
C	755		CEJQ101M16
C	901		CEJQ470M10
C	902		CKSRYB103K50
C	903		CKSRYB472K50
C	904	470µF/16V	CCH1331
C	911		CEJQ221M10
C	912		CKSRYB103K50
C	913		CEJQ101M16
C	921		CEJQ220M10
C	922		CKSRYB103K50
C	923		CKSYB475K10
C	931		CKSRYB104K25
C	961		CKSRYB473K50

C Unit Number : CWM8632
Unit Name : Keyboard Unit

MISCELLANEOUS

IC	1901	IC	PD6340A
D	1801	LED	NSSW440-9159
D	1802	LED	NSSW440-9159
D	1803	LED	SML-310PT
D	1804	LED	SML-310PT
D	1805	LED	SML-310PT
D	1806	LED	SML-310PT
D	1807	LED	SML-310PT
D	1808	LED	SML-310PT
D	1809	LED	SML-310PT
D	1810	LED	SML-310PT
D	1811	LED	SML-310PT
D	1812	LED	SML-310PT
D	1813	LED	SML-310PT
D	1814	LED	SML-310PT
D	1901	Diode	DAN202U
D	1902	Diode	DAP202U
X	1901	Ceramic Resonator 4.97MHz	CSS1422
IL	1801	Lamp 14V 40mA	CEL1651
IL	1802	Lamp 14V 40mA	CEL1651
LCD	1901	LCD	CAW1757

=====Circuit Symbol and No.	===	Part Name	Part No.

RESISTORS

R	1801		RS1/16S151J
R	1802		RS1/16S151J
R	1803		RS1/16S151J
R	1804		RS1/16S181J
R	1805		RS1/16S151J
R	1806		RS1/16S181J
R	1807		RS1/16S181J
R	1808		RS1/16S151J
R	1809		RS1/16S181J
R	1810		RS1/16S181J
R	1811		RS1/16S151J
R	1812		RS1/16S181J
R	1813		RS1/16S181J
R	1814		RS1/16S151J
R	1815		RS1/16S181J
R	1903		RS1/16S473J
R	1904		RS1/16S222J
R	1905		RS1/16S222J
R	1906		RS1/16S473J

CAPACITORS

C	1801		CKSRYB104K16
C	1802		CKSRYB104K16
C	1901		CKSRYB224K10

B Unit Number : CWM8758
Unit Name : Panel Unit

MISCELLANEOUS

D	1970	LED	CL220PGC
S	1970	Push Switch(EJECT)	CSG1112

RESISTORS

R	1970		RS1/16S101J
R	1971		RS1/16S101J
R	1972		RS1/16S0R0J

CAPACITORS

C	1970		CKSRYB104K16

D Unit Number : CWX2742
Unit Name : CD Core Unit(S10MP3)

MISCELLANEOUS

IC	201	IC	UPD63760GJ
IC	202	IC	MSM51V4265EP-70TS
IC	203	IC	BA033SFP
IC	301	IC	BA5996FM
IC	701	IC	PE5352B
IC	702	IC	TC74VHCT08AFT
IC	703	IC	S-818A33AUC-BGN
Q	101	Transistor	2SB1132
Q	601	Transistor	DTC323TK
Q	602	Transistor	DTC323TK
Q	603	Transistor	2SB709A
Q	701	Transistor	UN2111
D	101	Diode	1SS355
D	201	Diode	1SR154-400
D	601	Diode	MA152WA
L	201	Inductor	CTF1386
L	202	Inductor	CTF1386
L	204	Inductor	CTF1386
L	205	Inductor	CTF1386
L	206	Inductor	CTF1386

=====Circuit Symbol and No.		===Part Name	Part No.
L	207	Inductor	CTF1386
L	208	Inductor	CTF1386
L	209	Inductor	CTF1386
L	211	Inductor	CTF1386
L	212	Inductor	CTF1386
L	701	Inductor	CTF1386
L	702	Inductor	LCYBR22J1608
L	703	Inductor	CTF1386
L	704	Inductor	CTF1386
TH	701	Thermistor	CCX1037
X	201	Ceramic Resonator 16.934MHz	CSS1603
X	701	Ceramic Resonator 16.00MHz	CSS1616
S	901	Switch(HOME)	CSN1051
S	902	Switch(CLAMP)	CSN1051
S	903	Spring Switch(DSCSNS)	CSN1052
S	904	Switch(12EJ)	CSN1051
S	905	Switch(8EJ)	CSN1051

RESISTORS

R	101		RS1/10S1R5J
R	102		RS1/10S1R5J
R	103		RS1/10S1R5J
R	104		RS1/10S1R5J
R	105		RS1/10S1R5J
R	201		RS1/16SS102J
R	202		RS1/16SS333J
R	203		RS1/16SS333J
R	205		RS1/16SS0R0J
R	207		RS1/16SS0R0J
R	209		RS1/16SS0R0J
R	212		RS1/16SS221J
R	213		RS1/16SS1002D
R	214		RS1/16SS1002D
R	215		RS1/16SS6801D
R	216		RS1/16SS6801D
R	217		RS1/16SS1002D
R	218		RS1/16SS1002D
R	219		RS1/16SS1002D
R	220		RS1/16SS1002D
R	221		RS1/16SS103J
R	222		RS1/16SS103J
R	223		RS1/16SS103J
R	224		RS1/16SS103J
R	225		RS1/16SS103J
R	226		RS1/16SS393J
R	227		RS1/16SS103J
R	228		RS1/16SS182J
R	229		RS1/16SS103J
R	231		RS1/16SS0R0J
R	232		RS1/16SS182J
R	233		RS1/16SS0R0J
R	237		RS1/16SS104J
R	238		RS1/16SS473J
R	239		RS1/16SS333J
R	240		RS1/16SS0R0J
R	301		RS1/16SS183J
R	302		RS1/16SS822J
R	303		RS1/16SS0R0J
R	304		RS1/16SS183J
R	305		RS1/16SS822J
R	306		RS1/16SS0R0J
R	307		RS1/16SS183J
R	308		RS1/16SS822J
R	309		RS1/16SS183J

=====Circuit Symbol and No.		===Part Name	Part No.
R	310		RS1/16SS822J
R	311		RS1/16SS0R0J
R	601		RS1/16S101J
R	602		RS1/16S101J
R	603		RS1/16S223J
R	604		RS1/16S223J
R	605		RS1/16SS103J
R	707		RS1/16SS0R0J
R	708		RS1/16SS102J
R	710		RS1/16SS102J
R	711		RS1/16SS102J
R	712		RS1/16SS102J
R	713		RS1/16SS102J
R	714		RS1/16SS473J
R	715		RAB4CQ221J
R	716		RAB4CQ221J
R	717		RAB4CQ221J
R	718		RAB4CQ221J
R	719		RAB4CQ221J
R	720		RS1/16SS471J
R	721		RS1/16SS471J
R	722		RAB4CQ221J
R	723		RS1/16SS102J
R	724		RN1/16SE1302D
R	725		RS1/16SS222J
R	726		RS1/16SS103J
R	727		RS1/16SS473J
R	728		RS1/16SS473J
R	729		RS1/16SS223J
R	730		RS1/16SS473J
R	731		RS1/16SS104J
R	732		RS1/16SS104J
R	733		RS1/16SS104J
R	737		RAB4CQ473J
R	739		RAB4CQ473J
R	740		RS1/16SS473J
R	742		RS1/16SS104J
R	744		RS1/16SS104J
R	745		RS1/16SS473J
R	746		RS1/16SS104J
R	747		RS1/16SS104J
R	748		RS1/16SS104J
R	754		RS1/16SS102J
R	755		RS1/16SS102J
R	756		RS1/16SS104J
R	801		RS1/16SS104J
R	802		RS1/16SS473J
R	803		RS1/16SS273J
R	901		RS1/16SS221J
R	902		RS1/16SS221J
R	903		RS1/16SS221J
R	904		RS1/16SS221J
R	905		RS1/16SS221J
R	906		RS1/16SS221J

CAPACITORS

C	101		CKSSYB104K10
C	102		CKSSYB104K10
C	103		CEV101M16
C	104		CEV101M4
C	105		CKSSYB104K10
C	106		CCSRCH101J50
C	108		CKSSYB104K10
C	109		CEV100M16
C	201		CKSSYB471K50
C	202		CKSSYB104K10

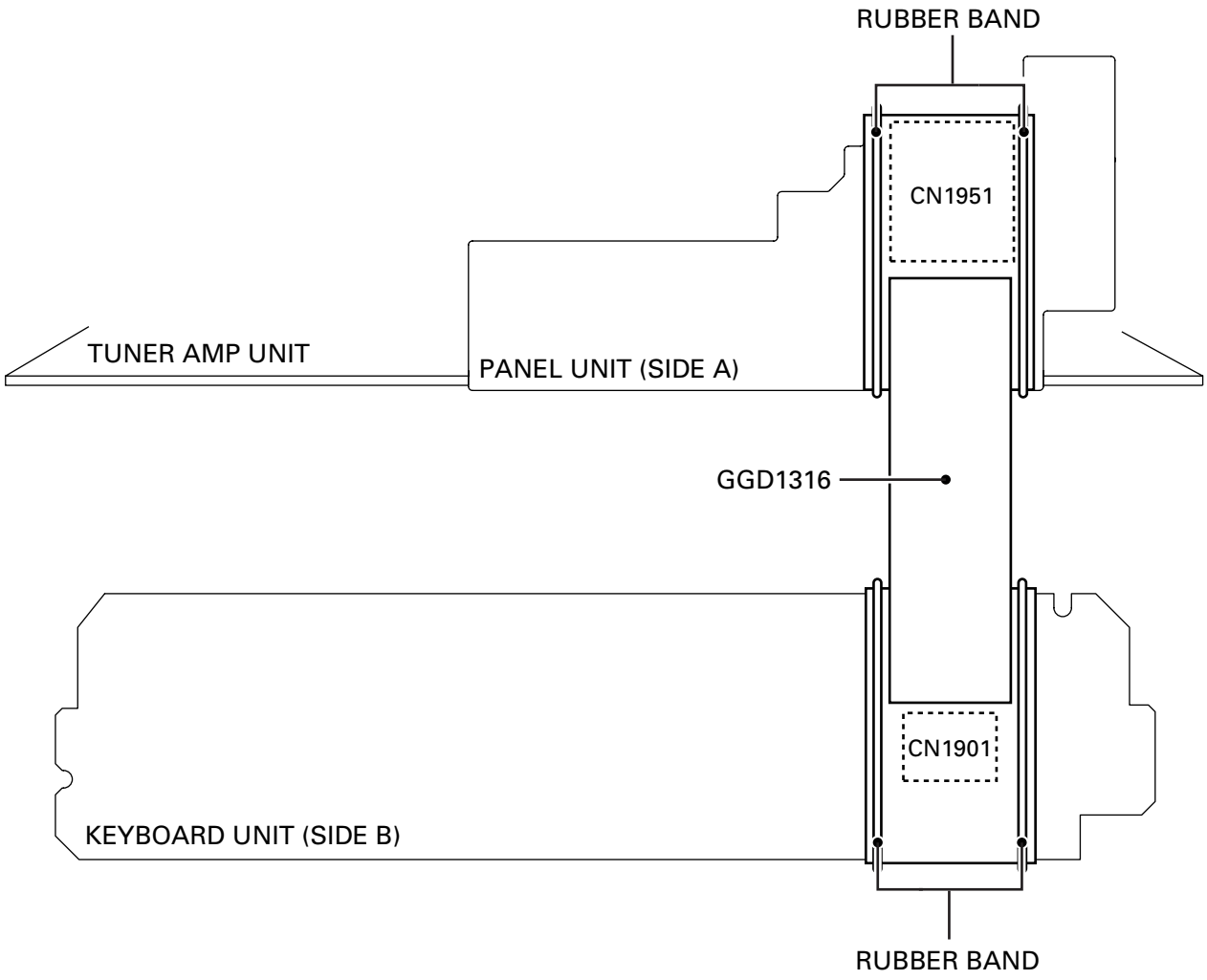
	=====Circuit Symbol and No.		===Part Name	Part No.
	---	------	----------	----------
	C	203		CKSSYB104K10
	C	204		CEV220M6R3
	C	205		CKSSYB103K16
	C	206		CKSSYB103K16
	C	207		CEV221M4
	C	208		CKSSYB104K10
	C	209		CKSSYB104K10
	C	210		CKSSYB104K10
	C	211		CKSSYB104K10
	C	216		CKSSYB332K50
	C	217		CKSSYB104K10
	C	218		CKSSYB223K16
B	C	219		CKSSYB104K10
	C	220		CKSSYB103K16
	C	221		CKSSYB104K10
	C	222		CCSSCH270J50
	C	223		CCSSCJ3R0C50
	C	224		CKSSYB104K10
	C	225		CKSSYB103K16
	C	226		CCSSCH680J50
	C	227		CCSSCH470J50
	C	228		CKSSYB682K25
	C	230		CKSSYB104K10
	C	232		CKSSYB104K10
	C	233	47µF/6.3V	CCH1436
C	C	234		CEV221M4
	C	235		CKSRYB224K16
	C	237		CKSSYB104K10
	C	238		CKSSYB104K10
	C	239		CCSSCH9R0D50
	C	242		CKSSYB104K10
	C	243		CKSSYB104K10
	C	245		CKSSYB104K10
	C	246		CKSSYB104K10
	C	301		CKSSYB331K50
	C	302		CKSSYB331K50
	C	303		CKSSYB472K25
	C	304		CKSSYB472K25
	C	305		CEV101M16
D	C	306		CKSRYB224K16
	C	601		CCSRCH102J50
	C	602		CCSRCH102J50
	C	603	4.7µF/25V	CCH1508
	C	604	4.7µF/25V	CCH1508
	C	701		CKSSYB104K10
	C	702		CKSSYB471K50
	C	703		CKSSYB103K16
	C	704		CEV1R0M50
	C	705		CKSSYB104K10
	C	706		CKSSYB471K50
	C	707		CKSSYB104K10
	C	708		CKSSYB104K10
E	C	709		CKSSYB103K16
	C	710		CKSSYB104K10
	C	711	10µF/10V	CCH1349
	C	712		CKSRYB224K16
	C	713		CKSSYB104K10
	C	714		CKSSYB104K10
	C	715		CKSSYB103K16
	C	716		CKSSYB103K16
	C	901		CKSSYB104K10
	C	903		CCSRCH101J50

Miscellaneous Parts List

		Pickup Unit(Service)(P10)	CXX1641
F	M	1 Motor Unit(SPINDLE)	CXB6007
	M	2 Motor Unit(LOADING/CARRIAGE)	CXB8933

6. ADJUSTMENT

6.1 JIG CONNECTION DIAGRAM



6.2 CD ADJUSTMENT

1) Cautions on adjustments

• In this product the single voltage (3.3V) is used for the regulator. The reference voltage is the REFO1 (1.65V) instead of the GND.
If you should mistakenly short the REFO1 with the GND during adjustment, accurate voltage will not be obtained, and the servo's misoperation will apply excessive shock to the pickup. To avoid such problems:
a. Do not mix up the REFO1 with the GND when connecting the (-) probe of measuring instruments. Especially on an oscilloscope, avoid connecting the (-) probe for CH1 to the GND.
b. In many cases, measuring instruments have the same potential as that for the (-) probe. Be sure to set the measuring instruments to the floating state.
c. If you have mistakenly connected the REFO1 to the GND, turn off the regulator or the power immediately.

• Before mounting and removing filters or leads for adjustment, be sure to turn off the regulator.

• For stable circuit operation, keep the mechanism operating for about one minute or more after the regulator is turned on.

• In the test mode, any software protections will not work. Avoid applying any mechanical or electrical shock to the mechanism during adjustment.

• The RFI and RFO signals with a wide frequency range are easy to oscillate. When observing the signals, insert a resistor of 1k ohms in series.

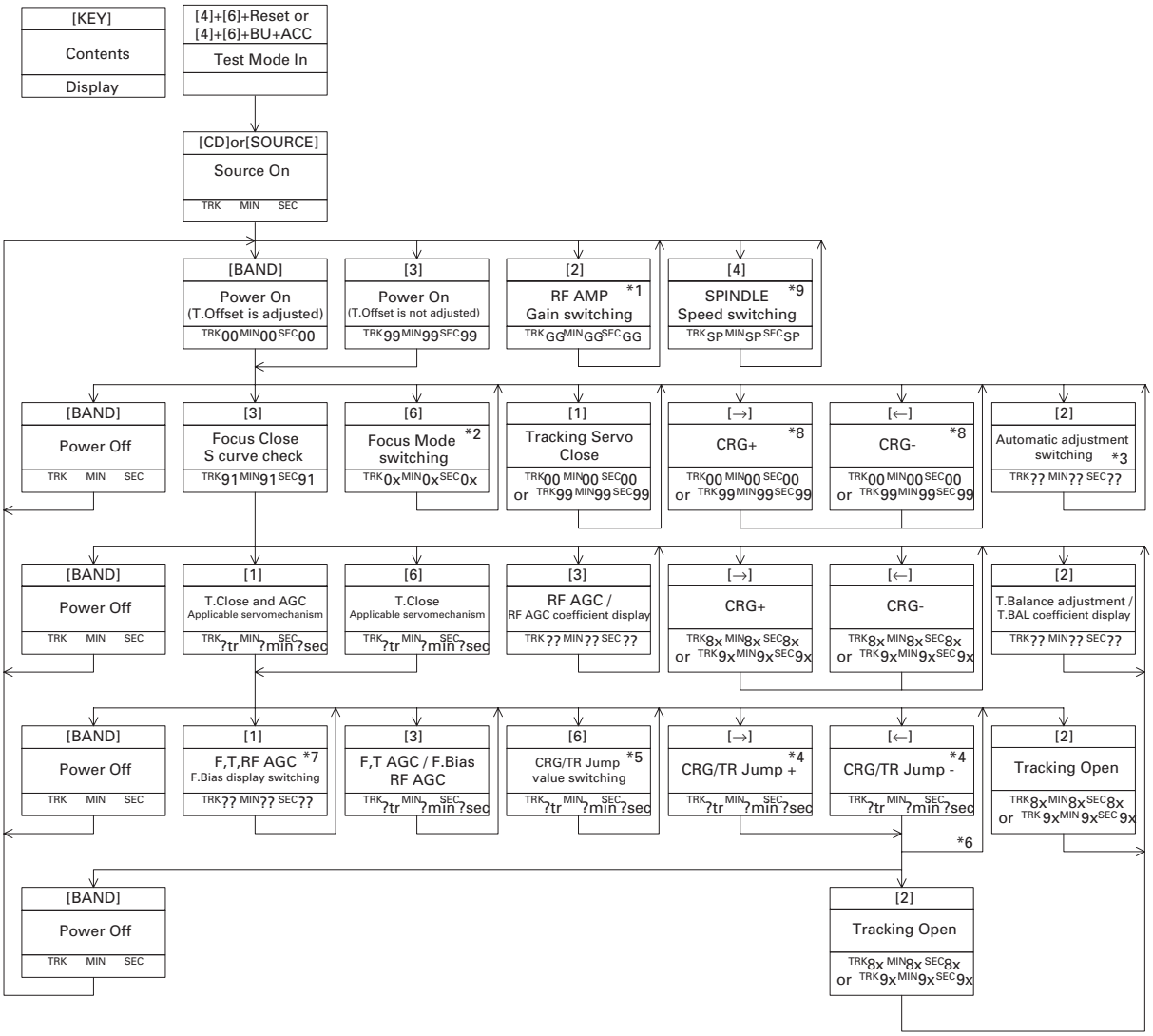
• The load and eject operation is not guarantied with the mechanism upside down. If the mechanism is blocked due to mistaken eject operation, reset the product or turn off and on the ACC to restore it.

2) Test mode

This mode is used to adjust the CD mechanism module.
• To enter the test mode.
While pressing the 4 and 6 keys at the same time, reset.
• To exit from the test mode.
Turn off the ACC and back up.

Notes:
a. During ejection, do not press any other keys than the EJECT key until the loaded disc is ejected.
b. If you have pressed the (→) key or (←) key during focus search, turn off the power immediately to protect the actuator from damage caused by the lens stuck.
c. For the TR jump modes except 100TR, the track jump operation will continue even if the key is released.
d. For the CRG move and 100TR jump modes, the tracking loop will be closed at the same time when the key is released.
e. When the power is turned off and on, the jump mode is reset to the single TR (91), the RF amp gain is set to 0dB, and the auto-adjustment values are reset to the default settings.

● Flow Chart



*1) TYP → -6dB → -12dB

*2) Focus Close → S.Curve check setting → F EQ measurement setting

*3) F.Offset Display → T.Offset Display → Switch to the order of the original display

*4) 1TR / 32TR / 100TR

*5) Single TR → 32TR → 100TR → CRG Move
9x(8x) : 91(81) 92(82) 93(83) 94(84)

*6) Only at the time of CRG move, 100TR jump

*7) TRK/MIN/SEC → F.AGC → T.AGC → F Bias → RF AGC

*8) CRG motor voltage = 2[V]

*9) Applicability : A, B, C, D, E, F
TYP(1X) → 2X → 1X

As for the double speed (2x), audio output cannot be supported

Applicability : G
TYP(2X) → 1X → 2X

[Key]	Operation Test Mode
[BAND]	Power On / Off
[→]	CRG + / TR Jump + (Direction of the external surface)
[←]	CRG - / TR Jump - (Direction of the internal surface)
[1]	U.CLS and AGC and Applicable servomechanism / AGC, AGC display setting
[2]	RF Gain switching / Offset adjustment display / T.Balance adjustment / T.Open
[3]	Close, S.Curve / Rough Servo and RF AGC / F, T, RF AGC
[4]	SPDL 1X / 2X switching As for the double speed (2x), audio output cannot be supported.
[5]	Error Rate measurement 1st - ON : ERR count Beginning (30Sec) 2nd - ON : BER display data [%]
[6]	F.Mode switching / Tracking Close / CRG • TR Jump switching

6.3 CHECKING THE GRATING AFTER CHANGING THE PICKUP UNIT

• **Note :**
The grating angle of the PU unit cannot be adjusted after the PU unit is changed. The PU unit in the CD mechanism module is adjusted on the production line to match the CD mechanism module and is thus the best adjusted PU unit for the CD mechanism module. Changing the PU unit is thus best considered as a last resort. However, if the PU unit must be changed, the grating should be checked using the procedure below.

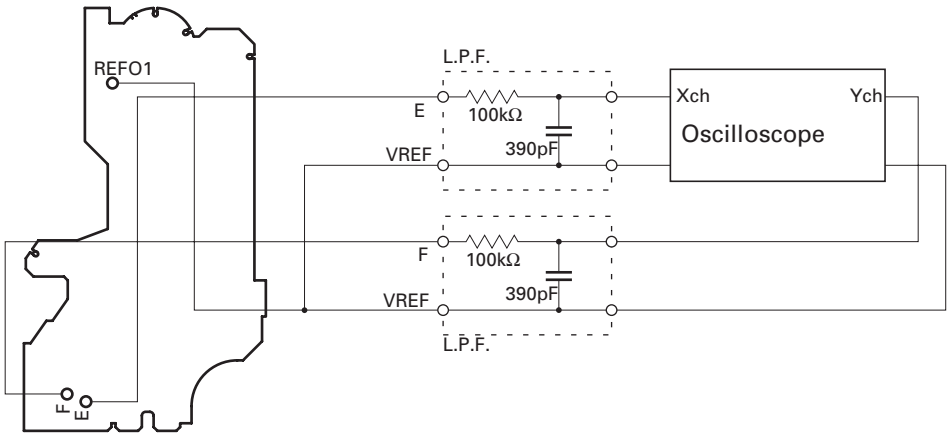
• **Purpose :**
To check that the grating is within an acceptable range when the PU unit is changed.

• **Symptoms of Mal-adjustment :**
If the grating is off by a large amount symptoms such as being unable to close tracking, being unable to perform track search operations, or taking a long time for track searching.

• **Method :**

• Measuring Equipment	• Oscilloscope, Two L.P.F.
• Measuring Points	• E, F, REFO1
• Disc	• ABEX TCD-782
• Mode	• TEST MODE

CD CORE UNIT(S10MP3)



• **Checking Procedure**
1. In test mode, load the disc and switch the 3V regulator on.
2. Using the → and ← buttons, move the PU unit to the innermost track.
3. Press key 3 to close focus, the display should read "91". Press key 2 to implement the tracking balance adjustment the display should now read "81". Press key 3. The display will change, returning to "81" on the fourth press.
4. As shown in the diagram above, monitor the LPF outputs using the oscilloscope and check that the phase difference is within 75° . Refer to the photographs supplied to determine the phase angle.
5. If the phase difference is determined to be greater than 75° try changing the PU unit to see if there is any improvement. If, after trying this a number of times, the grating angle does not become less than 75° then the mechanism should be judged to be at fault.

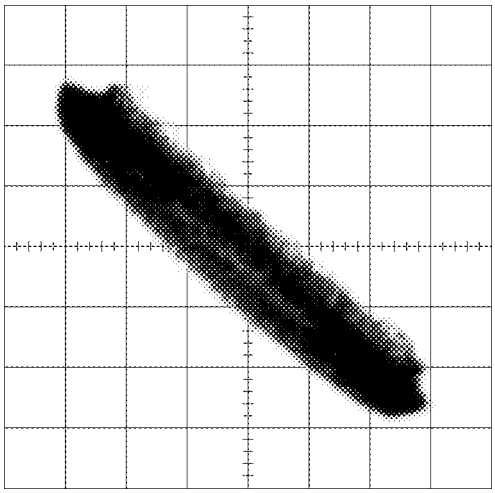
• **Note**
Because of eccentricity in the disc and a slight misalignment of the clamping center the grating waveform may be seen to "wobble" (the phase difference changes as the disc rotates). The angle specified above indicates the average angle.

• **Hint**
Reloading the disc changes the clamp position and may decrease the "wobble".

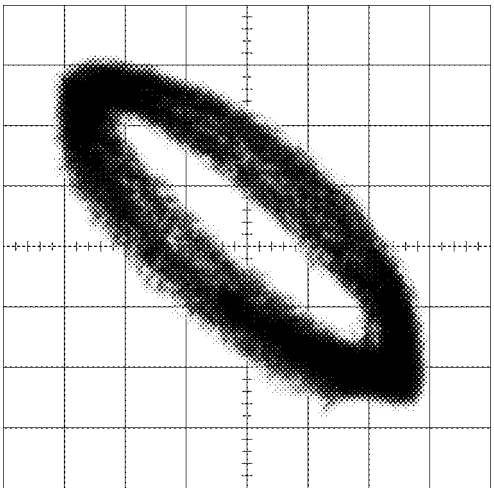
Grating waveform

Ech → Xch 20mV/div, AC
Fch → Ych 20mV/div, AC

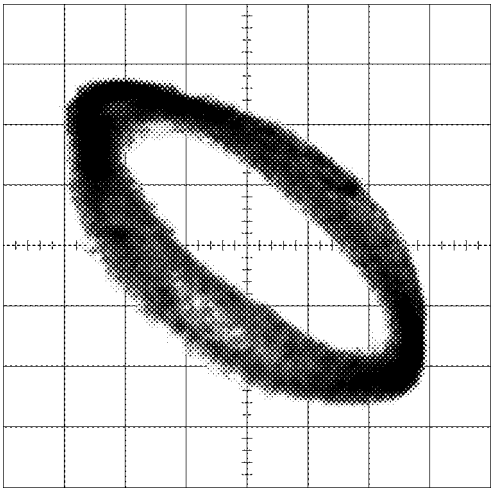
0°



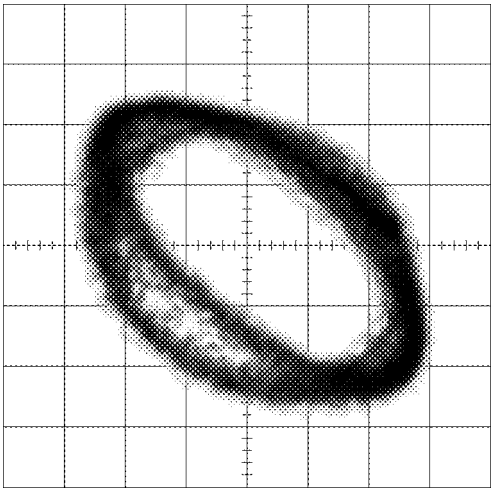
30°



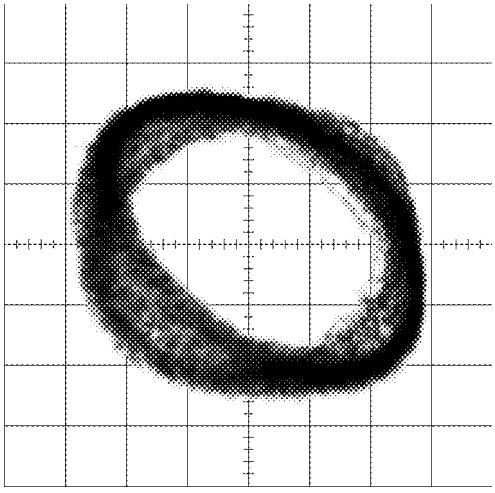
45°



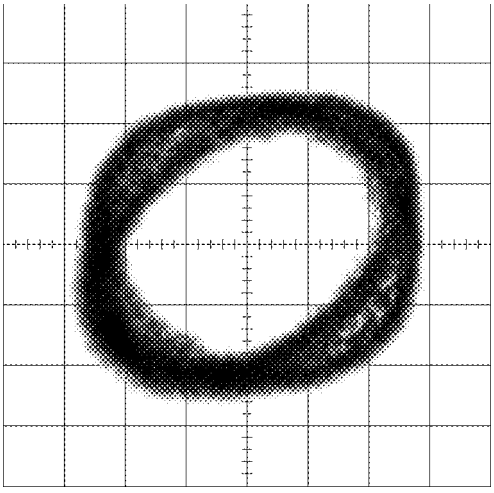
60°



75°



90°



6.4 ERROR MODE

● Error Messages

Error is displayed with number for Error cause when CD is inoperative or stops with Error during operation. The purpose is to reduce nonsense calls from users as well as to assist all related analysis and repair for defects at service station.

(1) Basic Display Method

1) When CSMOD (CD mode area for system) is SERRORM, Error code will be written in DMIN (minutes area for display), DSEC (seconds area for display). The same data shall be written in DMIN and DSEC. DTNO is blank as usual.

2) Display Example of Head Unit

The following is about LCD display ability. xx is Error number.

8 digits	6 digits	4 digits
ERROR–xx	ERR–xx OR Err–xx	E–xx

*) In case of OEM, Error display will follow the specification defined by OEM makers.

(2) Error Code List

No.	Classification	Contents	Details • Cause
10	Electricity	Carriage Home NG	CRG can't move to the inner. CRG can't move from the inner. → HOME SW failure, CRG movement failure.
11	Electricity	Focus Search NG	Focus can't be caught. → Back of Disc / Severe dirt and vibration.
12	Electricity	Spindle Lock NG Subcode NG RF-amp NG	Not spindle, lock. Wrong subcode (can't read). → Defective Spindle. Scratch and dirt on Disc. Intense vibration. The appropriate gain of the RF amp cannot be obtained. → Defective spindle. → Scratched or dirty disc. Severe vibration. Abnormal CD signals. → Blanc CD-R disc. Disc inserted upside down.
17	Electricity	Setup NG	AGC protection doesn't work, out of Focus soon. → Scratch on Disc/Severe dirt and vibration.
22	Disc	Impossible to play	There is no playable MP3 or WMA file present in a disc. → No MP3 or WMA file exists in a CD-ROM disc inserted.
23	Disc	File Format NG	Contents are stored in an incompatible file format. → The contents in a CD-ROM disc inserted are recorded in a file format other than ISO9660 Level-1 and 2.
30	Electricity	Search Time Out	Can't reach the target address. → Defective CRG/tracking, or scratch on Disc.
44	Disc	Impossible to play	There is no playable TRK No. present in a disc. → All TRK Nos. In a disc inserted are specified as a track which should be skipped, in the track skip information.
50	Mecha	Disc Load / Eject NG	Disc loading/ejection cannot be complete. → Foreign objects entered into the mechanism. Disc caught in between during loading/ejection.
A0	System	Power NG	Power supply (VD) isn't connected to the ground. → Defective SW transistor. Abnormal power (failed connector)

Note : Error doesn't display in mechanism only. (CD off causes mechanism off)
If TOC can't be read, error wouldn't occur, but mechanism still continues its operation.
When newly design head unit, be sure to apply as the display examples above.
The upper digits of error code is mainly classified by 3 kinds as follows:
1x: Setup related error, 3x: Search related error, Ax: Other errors.

7. GENERAL INFORMATION

7.1 DIAGNOSIS

7.1.1 DISASSEMBLY

● Removing the Case (not shown)

1. Remove the Case.

● Removing the CD Mechanism Module (Fig.1)

1 Remove the four screws.

Disconnect the connector and then remove the CD Mechanism Module.

● Removing the Grille Assy (Fig.1)

2 Remove the two screws and then remove the Grille Assy.

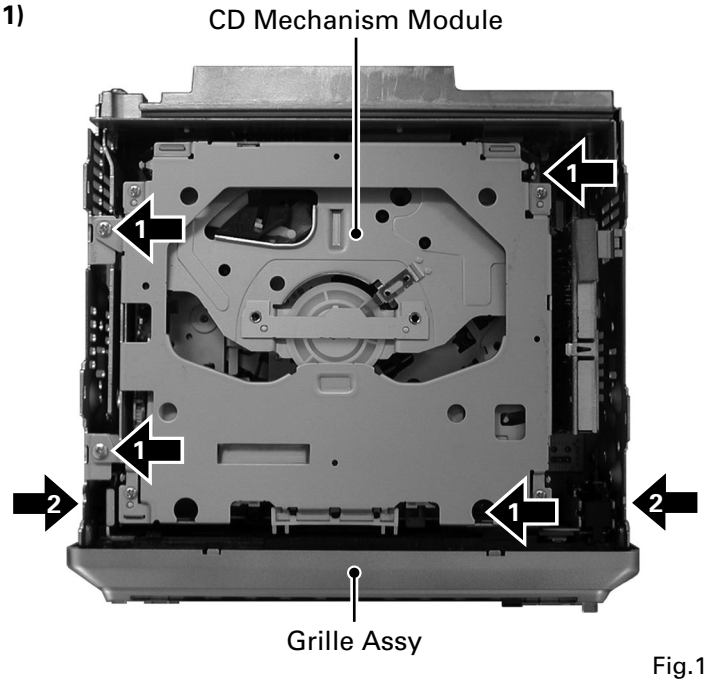


Fig.1

● Removing the Tuner Amp Unit (Fig.2)

1 Remove the screw.

2 Remove the three screws.

3 Straight the tabs at three locations indicated.

4 Remove the screw and then remove the Tuner Amp Unit.

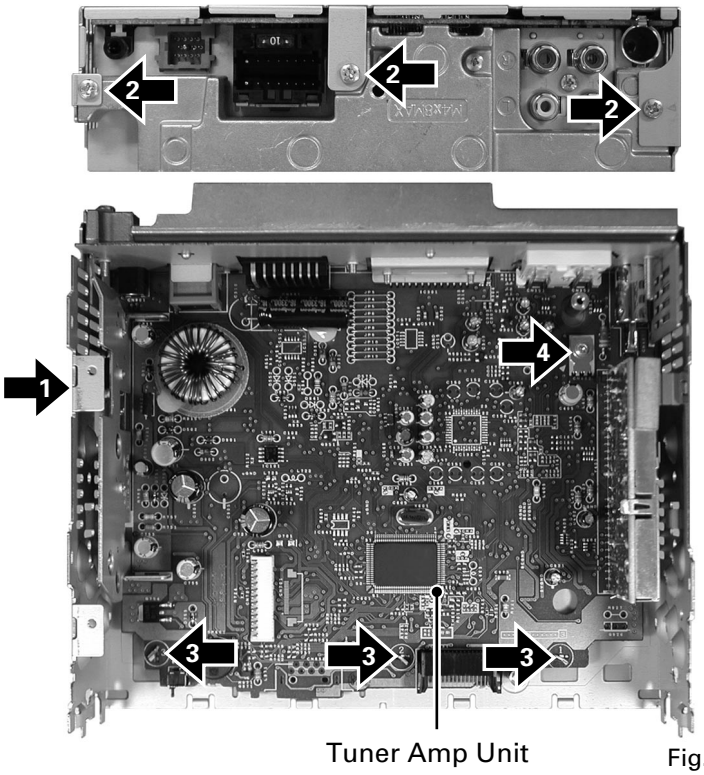
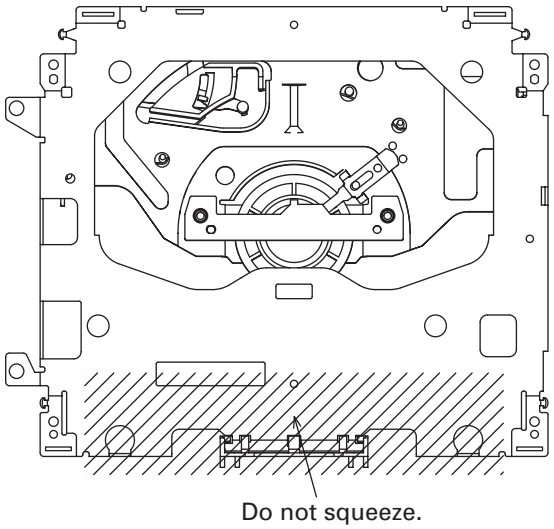


Fig.2

● How to hold the Mechanism Unit

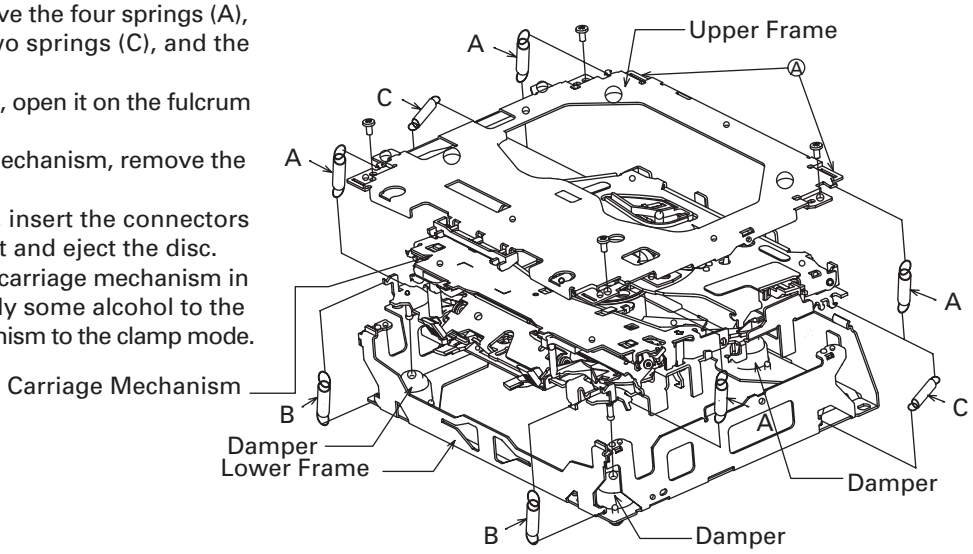
1. Hold the top and bottom frame.
2. Do not squeeze top frame's front portion too tight, because it is fragile.



● Removing the Upper and Lower Frames

1. With a disc clamped, remove the four springs (A), the two springs (B), the two springs (C), and the four screws.
2. To remove the upper frame, open it on the fulcrum A.
3. While lifting the carriage mechanism, remove the three dampers.
4. With the frames removed, insert the connectors coming from the main unit and eject the disc.

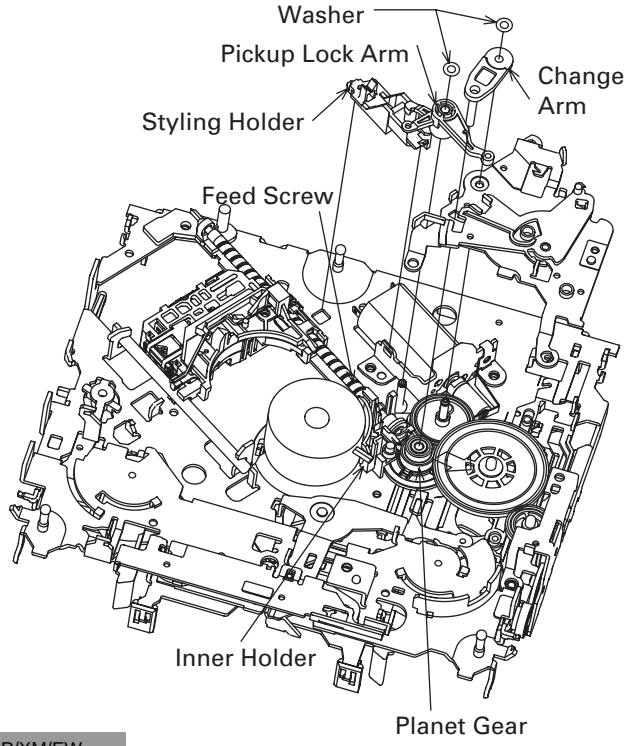
Caution: Before installing the carriage mechanism in the frames, be sure to apply some alcohol to the dampers and set the mechanism to the clamp mode.



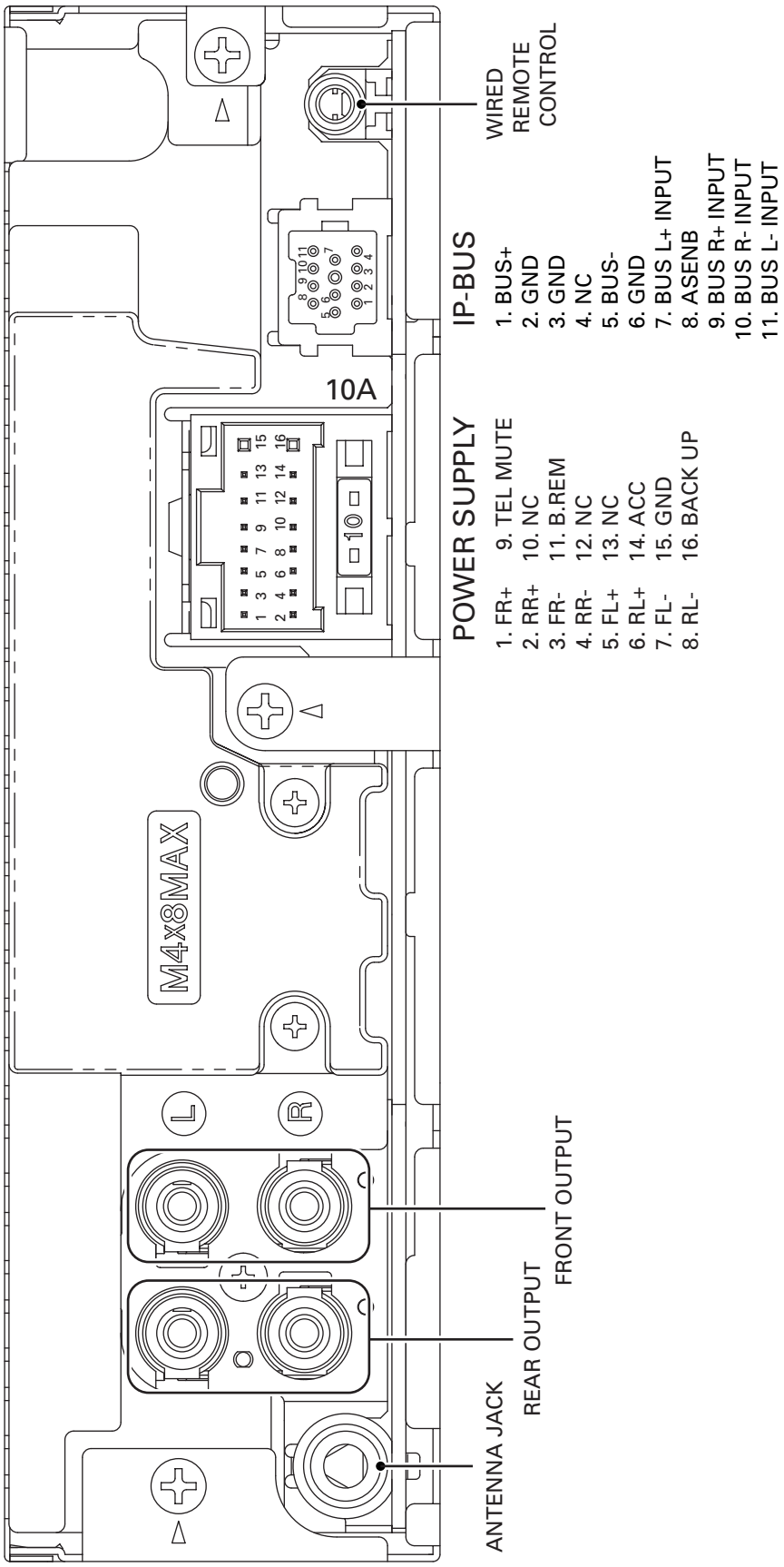
● Removing the Pickup Unit

1. Set the mechanism to the clamp mode.
2. Remove the lead wires from the inner holder.
3. Remove the two washers, styling holder, change arm, and pickup lock arm.
4. While releasing from the hook of the inner holder, lift the end of the feed screw.

Caution: In assembling, move the planet gear to the load/eject position before setting the feed screw in the inner holder.



7.1.2 CONNECTOR FUNCTION DESCRIPTION



7.2 PARTS

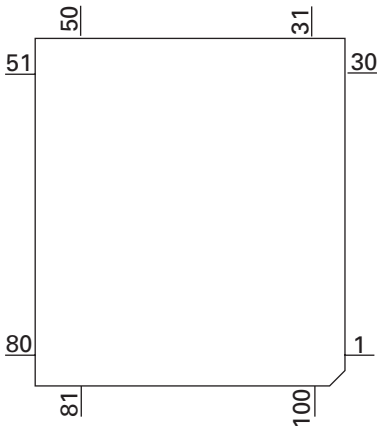
7.2.1 IC

● **Pin Functions(PE5338A)**

Pin No.	Pin Name	I/O	Format	Function and Operation
1	$\overline{\text{SWVDD}}$	O	C	Grille : Chip enable output
2-4	NC			Not used
5	TESTIN	I		Test program mode input
6	LCDPW	O	C	LCD back light power supply control output
7	TELIN	I		Telephone mute input
8	$\overline{\text{EJECTIN}}$	I		Eject sense input
9	FLPILM	I		Flap illumination input
10	DALMON	I/O	C	For consumption low-current
11	$\overline{\text{RESET}}$	I		Reset input
12	XT2			Not used
13	XT1	I		Clock connection pin
14	VSS			GND
15	X2			Crystal oscillator connection pin
16	X1	I		Crystal oscillator connection pin
17	REGOFF	I		Regulator operation specification signal
18	REGC			Capacitor for regulator connect pin
19	VDD			Power supply
20	ILMPW	O		Illumination power supply control output
21	SYSPW	O	C	System power control output
22	$\overline{\text{ADPW}}$	O	C	A/D converter power supply control output
23	NC			Not used
24	IPPW	O	C	Power supply control output for IP BUS interface IC
25	NC			Not used
26	ROMDATA	O	C	ROM correction data output
27	NC			Not used
28	NC			Not used
29-31	NC			Not used
32	$\overline{\text{TUNPCE2}}$	O		PLL chip enable output2
33	VST	O		E.VOL : Strobe output
34	VCK	O		E.VOL : Clock output
35	VDT	O		E.VOL : Data output
36	ANTPW	O		Antenna power output
37	MUTE	O	C	System mute output
38, 39	NC			Not used
40	VSS			GND
41	VDD			Power supply
42	RDS57K	I		57kHz count pulse input
43	NC			Not used
44	$\overline{\text{RDSLK}}$	I	C	RDS : Decoder clock input
45	RDT	I		RDS : Decoder data input
46	DORAON	O	C	TUNER : 3V power supply
47-57	NC			Not used
58	STRKEY2	I		Steering remote controller input
59	CDLOEJ	O	C	CD : Load Moter Load/Eject output
60	CLCONT	O		CD : Driver input switch output
61	CONT	O	C	CD : Servo driver power supply control output
62	PCL	O	C	Clock adjustment
63	CLAMPSW	I		Clamp SW input
64	VDCONT	O	C	CD : VD power control output
65	$\overline{\text{XSCK}}$(TSCK)	O		CD LSI clock output
66	XSI(TSI)	I		CD LSI data input
67	XSO(TSO)	O	C	CD LSI data output
68	XAO	O	C	CD LSI command/data control output
69	$\overline{\text{XRST}}$	O	C	CD : LSI reset control output
70	$\overline{\text{XSTB}}$	O		CD LSI strobe output
71	ASENBO	O		IP-BUS : Slave power supply control output
72	NC			Not used
73	TEST			GND
74	SL	I	C	TUNER : Signal level input
75	STRKEY1	I	C	Steering remote controller input

Pin No.	Pin Name	I/O	Format	Function and Operation
76	NC			Not used
77	CSENS	I		Flap close sense input
78	NC			Not used
79	DSCSNS	I		CD : Disc insert sense input
80	VDSENS	I		CD : VD voltage sense input
81	TEMP	I		CD : Temperature sense input
82	AVDD			A/D converter power supply terminal
83	AVREF			A/D converter reference voltage terminal
84	AVSS			GND
85	RX	I		IP-BUS : Data input
86	TX	O		IP-BUS : Data output
87	NMI			GND
88	$\overline{\text{LDET}}$	I		PLL lock sense input
89	$\overline{\text{RCK}}$	I		RDS : Clock input
90	$\overline{\text{DSENS}}$	I		Grille detach sense input
91	PACK	I		PACK input
92	$\overline{\text{ASENS}}$	I		ACC power sense input
93	$\overline{\text{BSENS}}$	I		Back up power sense input
94	TUNPDI	I		PLL IC data input
95	KYDT	I		Grille data input
96	DPDT	O	C	Grille data output
97	TUNPCK	O		PLL clock output
98	TUNPDO	O	C	PLL data output
99	TUNPCE	O	C	PLL chip enable output
100	PEE	O	C	Beep tone output

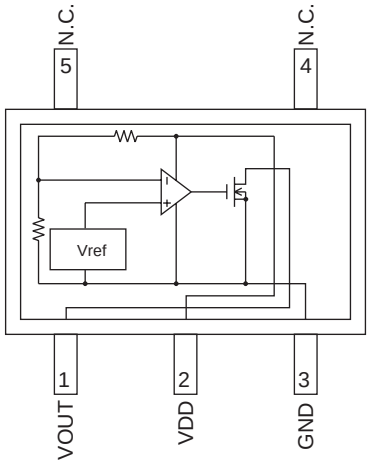
* PE5338A



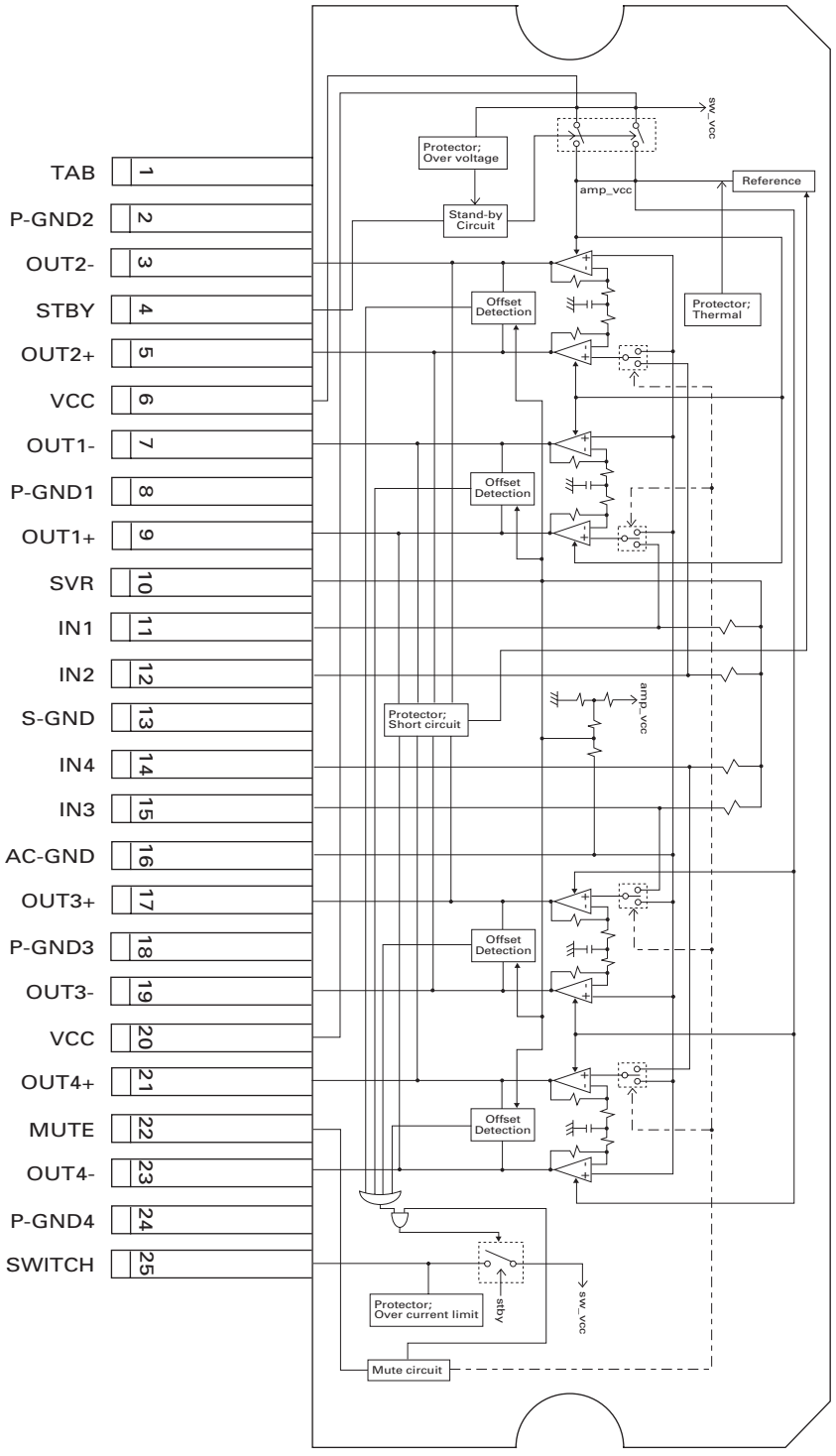
Format	Meaning
C	CMOS

IC's marked by * are MOS type.
Be careful in handling them because they are very liable to be damaged by electrostatic induction.

BD4834G



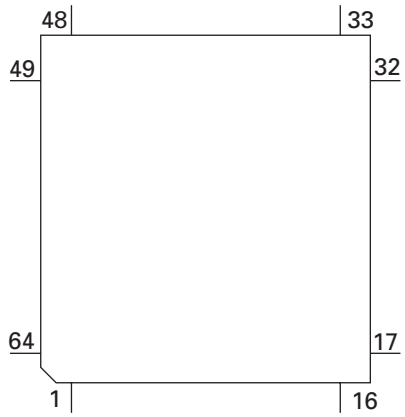
PAL007A


TAB 1
P-GND2 2
OUT2- 3
STBY 4
OUT2+ 5
VCC 6
OUT1- 7
P-GND1 8
OUT1+ 9
SVR 10
IN1 11
IN2 12
S-GND 13
IN4 14
IN3 15
AC-GND 16
OUT3+ 17
P-GND3 18
OUT3- 19
VCC 20
OUT4+ 21
MUTE 22
OUT4- 23
P-GND4 24
SWITCH 25
Protector; Over voltage
Stand-by Circuit
sw_vcc
Reference
amp_vcc
Offset Detection
Protector; Thermal
Protector; Short circuit
atten_vcc
Protector; Over current limit
stby
Mute circuit

● Pin Functions (PD6340A)

Pin No.	Pin Name	I/O	Function and Operation
1-5	SEG4-0	O	LCD segment output
6-9	COM3-0	O	LCD common output
10	VLCD		LCD drive power supply
11-14	KST3-0	O	Key strobe output
15,16	KDT0,1	I	Key data input (analogue input)
17	REM	I	Remote control reception input
18	DPDT	I	Display data input
19	NC		Not used
20	KYDT	O	Key data output
21	MODA		GND
22	X0		Crystal oscillator connection pin
23	X1		Crystal oscillator connection pin
24	VSS		GND
25,26	KDT2,3	I	Key data input
27	NC		Not used
28	KST4	O	Key strobe output
29-32	NC		Not used
33-55	SEG35-13	O	LCD segment output
56	VDD		Power supply
57-64	SEG12-5	O	LCD segment output

*PD6340A

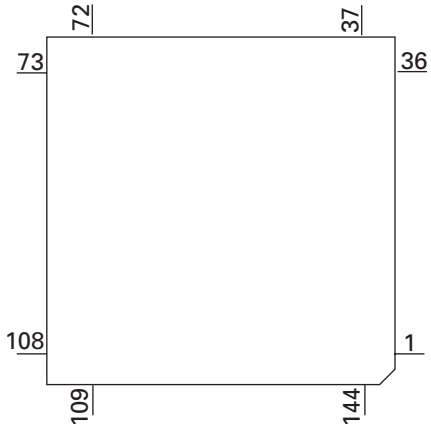


● Pin Functions (UPD63760GJ)

Pin No.	Pin Name	I/O	Function and Operation
1	R.GND		GND for DRAM I/F
2	$\overline{RST}$	I	Input of reset
3-7	AB12-8	I	Address bus 12-8 from the microcomputer
8-15	AD7-0	I/O	Address/data bus 7-0 to the microcomputer
16	$\overline{CS}$	I	Chip selection
17	ASTB	I	Address strobe
18	$\overline{READ}$	I	Control signals (read)
19	$\overline{WRITE}$	I	Control signals (write)
20	$\overline{WAIT}$	O	Control signals (wait)
21	INTQ		Interruption signals to the external microcomputer
22	IFMODE	I	Switching between the data buses (16bit/8bit)
23	D.VDD		Power supply for digital circuits
24	$\overline{XTALEN1}$	I	Permission to oscillate 16.9344MHz
25	$\overline{XTALEN2}$	I	Permission to oscillate 24.576MHz
26	DA.VDD		Power supply for DAC
27	ROUT	O	Output of audio for the right channel
28	DA.GND		GND for DAC
29	R+	O	Output of the right channel audio PWM
30	R-	O	Output of the right channel audio PWM
31	REGC		Connected to the capacitor for band gap
32	L-	O	Output of the left channel audio PWM
33	L+	O	Output of the left channel audio PWM
34	DA.GND		GND for DAC
35	LOUT	O	Output of audio for the left channel
36	DA.VDD		Power supply for DAC
37	X.VDD		Power supply for the crystal oscillator
38	XTAL1		Connected to the crystal oscillator (16.9344MHz)
39	$\overline{XTAL1}$		Connected to the crystal oscillator (16.9344MHz)
40, 41	X.GND		Ground for the crystal oscillator
42	$\overline{XTAL2}$		Connected to the crystal oscillator (24.576MHz)
43	XTAL2		Connected to the crystal oscillator (24.576MHz)
44	X.VDD		Power supply for the crystal oscillator
45	D.GND		GND for digital circuits
46	DIN	I	Input of audio data
47	DOUT	O	Output of audio data
48	SCKIN	I	Clock input for audio data
49	SCKO	O	Clock output for audio data
50	LRCKIN	I	Input of LRCK for audio data
51	LRCK	O	Output LRCK for audio data
52	TESTX	O	Output for tests
53	RFOK	O	Output of RFOK
54	C16M	O	Output of 16.9344MHz
55	TESTEN	I	Connected to GND
56	TEST4	I	Connected to GND
57	D.VDD		Power supply for digital circuits
58	RFCK/HOLD	O	Output of RFCK/HOLD signal
59	WFCK/MIRR	O	Output of WFCK/MIRR signal
60	PLCK	O	Output of PLCK
61	LOCK	O	Output of LOCK
62	C1D1	O	Information on error correction
63	C1D2	O	Information on error correction
64	C2D1(RMUTE)	O	Information on error correction (mute for Rch)
65	C2D2(LMUTE)	O	Information on error correction (mute for Lch)
66	C2D3	O	Information on error correction
67	D.GND		Ground for digital circuits
68	$\overline{RAS}$	O	Output of DRAM RAS
69	$\overline{CAS0}$	O	Output of DRAM Lower CAS
70	$\overline{CAS1}$	O	Output of DRAM Upper CAS
71	$\overline{WE}$	O	Output of DRAM WE
72	$\overline{OE}$	O	Output of DRAM OE

Pin No.	Pin Name	I/O	Function and Operation
73-88	RDB0-15	I/O	Input/output of DRAM Data0-15
89	D.GND		Ground for digital circuits
90-99	RA0-9	O	Output of DRAM Address0-9
100	D.VDD		Power supply for digital circuits
101-104	TEST0-3	I	Connected to GND
105	FD	O	Output of focus drive PWM
106	TD	O	Output of tracking drive PWM
107	SD	O	Output of thread drive PWM
108	MD	O	Output of spindle drive PWM
109	A.VDD		Power supply for the analog system
110	ATEST	O	Analog tests
111	EFM	O	Output of EFM signals
112	ASY	I	Input of asymmetry
113	C3T		Connection to the capacitor for detecting 3T
114	A.GND		Ground for the analog system
115	RFI	I	Input of RF
116	AGCO	O	Output of RF
117	AGCI	I	Input of AGC
118	RFO	O	Output of RF(AGC)
119, 120	EQ2, 1		Equalizer 2, 1
121	RF2-	I	Reversal input of RF2
122	RF-	I	Reversal input of RF
123	A.GND		Ground for the analog system
124	A	I	Input of A
125	C	I	Input of C
126	B	I	Input of B
127	D	I	Input of D
128	F	I	Input of F
129	E	I	Input of E
130	A.VDD		Power supply for the analog system
131	REFOUT	O	Output of reference voltage
132	REFC		Connected to the capacitor for output of REFOUT
133	FE-	I	Reversal input of FE
134	FEO	O	Output of FE
135	TE-	I	Reversal input of TE
136	TEO	O	Output of TE
137	TE2	O	TE2
138	TEC	I	TEC
139	A.GND		Ground for the analog system
140	LDREGO	O	Output of REG voltage for APC
141	PD	I	Input of PD
142	LD	O	Output of LD
143	PN	I	Assignment of pickup polarity
144	A.VDD		Power supply for the analog system

* UPD63760GJ

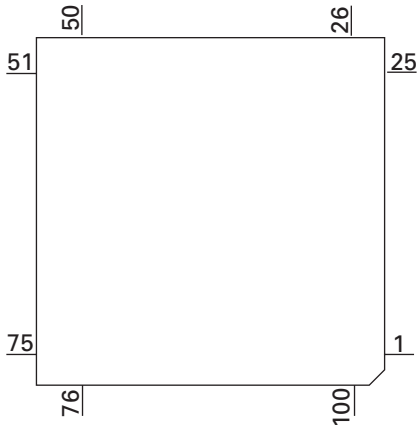


● Pin Functions (PE5352B)

Pin No.	Pin Name	I/O	Format	Function and Operation
1	BSO	O	C	P-Bus serial data output
2	$\overline{\text{BSCK}}$	I/O	/C	P-Bus serial clock input/output
3, 4	DFS1, 2	O	C	DA I/F IC sampling frequency setting output 1, 2
5	DCKS	O	C	DA I/F IC clock subharmonic number selection output
6	EVDD			E power supply Positive power supply
7	EVSS			E power supply GND
8	$\overline{\text{DSPOK}}$	I		DSP microcomputer initialization OK input
9	DCOPY	O	C	DA I/F IC copy flag setting output
10	$\overline{\text{CRST}}$	O	C	Compression IC reset control output
11, 12	NC			Not used
13	EMPH	O	C	Emphasis information output
14	$\overline{\text{EMPH}}$	O	C	Emphasis information output
15	DSPMUTE	O	C	DOUT mute output
16	DSET	O	C	Disc set indicator lighting output
17	$\overline{\text{ADENA}}$	O	C	A/D reference voltage supply control output
18	IC/VPP			IC : VSS direct connection/VPP : Pull-down
19	BRXEN	I/O	/C	P-Bus reception is possible
20	$\overline{\text{BSRQ}}$	I/O	/C	P-Bus service request demand
21	$\overline{\text{XTALEN1}}$	O	C	CD LSI 16.9344MHz oscillation permission output
22	$\overline{\text{XTALEN2}}$	O	C	CD LSI 24.576MHz oscillation permission output
23	$\overline{\text{XRST}}$	O	C	CD LSI reset control output
24	VDCONT	O	C	VD power supply control output
25	CD3VON	O	C	CD +3.3V power supply control output
26	CONT	O	C	Servo driver power supply control output
27	$\overline{\text{XWAIT}}$	I		CD LSI wait control signal input
28	LOEJ	O	C	The direction change output of LOAD/EJECT
29	CLCONT	O	C	Driver input change output
30	CDMUTE	O	C	CD mute control output
31	$\overline{\text{RESET}}$	I		System reset input
32	XT1	I		Connected to the oscillator for subclock (connected to VSS via the resistor)
33	XT2			Connected to the oscillator for subclock (Open)
34	REGC			Connected to the capacity stabilizing output of the regulator (an electrolytic capacitor of about 1μF)
35	X2			Oscillator connection for mainclock
36	X1	I		Oscillator connection for mainclock
37	VSS			GND
38	VDD			Positive power supply (5V)
39	CLKOUT	O	C	Internal system clock output (Open)
40	$\overline{\text{XWRITE}}$	O		CD LSI write control signal output
41	$\overline{\text{UBEN}}$	O		Not used (Open)
42	WR/W	O		WMA decoder Read/Write control signal output
43	$\overline{\text{XREAD}}$	O		CD LSI read control signal output
44	XASTB	O		CD LSI address strobe output
45	LOCK	I		Spindle lock input
46	$\overline{\text{WRST}}$	O	C	WMA decoder reset control output
47-54	AD0-7	I/O	/C	Address/Data bus 0-7
55	BVDD			B power supply Positive power supply (3.3V)
56	BVSS			B power supply GND
57-64	AD8-15	I/O	/C	Address/Data bus 8-15
65	$\overline{\text{XCS}}$	O	C	CD LSI chip selection output
66	$\overline{\text{WCS}}$	O	C	WMA decoder chip selection output
67, 68	DBBWRDY0, 1	I		Input of write-ready flag with WMA decoder DBBI0, 1
69, 70	DBBRRDY0, 1	I		Input of read-ready flag with WMA decoder DBBO0, 1
71	AVDD			A power supply Positive power supply (5V)
72	AVSS			A power supply GND
73	AVREF			The reference voltage input for A/D converter
74	VDSENS			VD power supply short sense input
75	DSCSNS			Disc state sense input
76	TEMP			Temperature information sense input

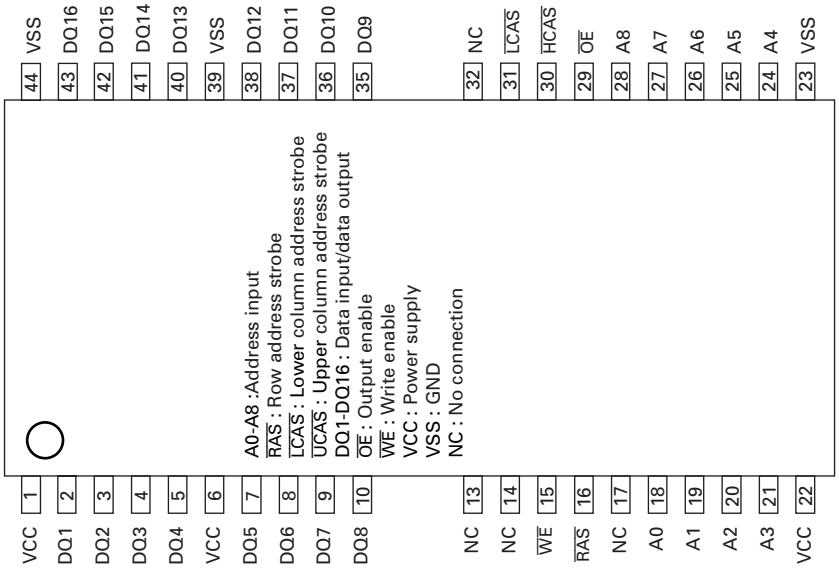
Pin No.	Pin Name	I/O	Format	Function and Operation
77	HOME	I		Home SW sense input
78	$\overline{\text{CSENS}}$	I		Flap closing sense input
79	RFOKIN	I		RFOK input chatter count input
80-82	NC			Connected to AVDD or AVSS via the resistor
83	WMAARI	I		Input of sensing existence of WMA decoder and DA I/F IC
84	TYPE_A/D	I		CD-DA Analog/Digital output change setup
85	$\overline{\text{TESTIN}}$	I		Chip check test program starting input
86	NC			Connected to EVDD or EVSS via the resistor
87	$\overline{\text{XINT}}$			CD LSI interruption signal input
88	$\overline{\text{WINT}}$			WMA decoder interruption signal input
89	$\overline{\text{BRST}}$	I		P-Bus reset input
90	$\overline{\text{EJSW}}$	I		Eject key input
91, 92	NC			Open
93	CLAMP	I	C	CLAMP SW sense input
94	ROMDATA	I/O	/C	E2PROM data input/output
95	ROMCS	O	C	E2PROM chip selection output
96	ROMCK	O	C	E2PROM clock output
97	FRXD	I		For flash rewriting (received signal)
98	FTXD	O	C	For flash rewriting (transmitted signal)
99	AO/DO	O	C	The output for Analog/Digital voice output distinction
100	BSI	I		P-Bus serial data input

* PE5352B

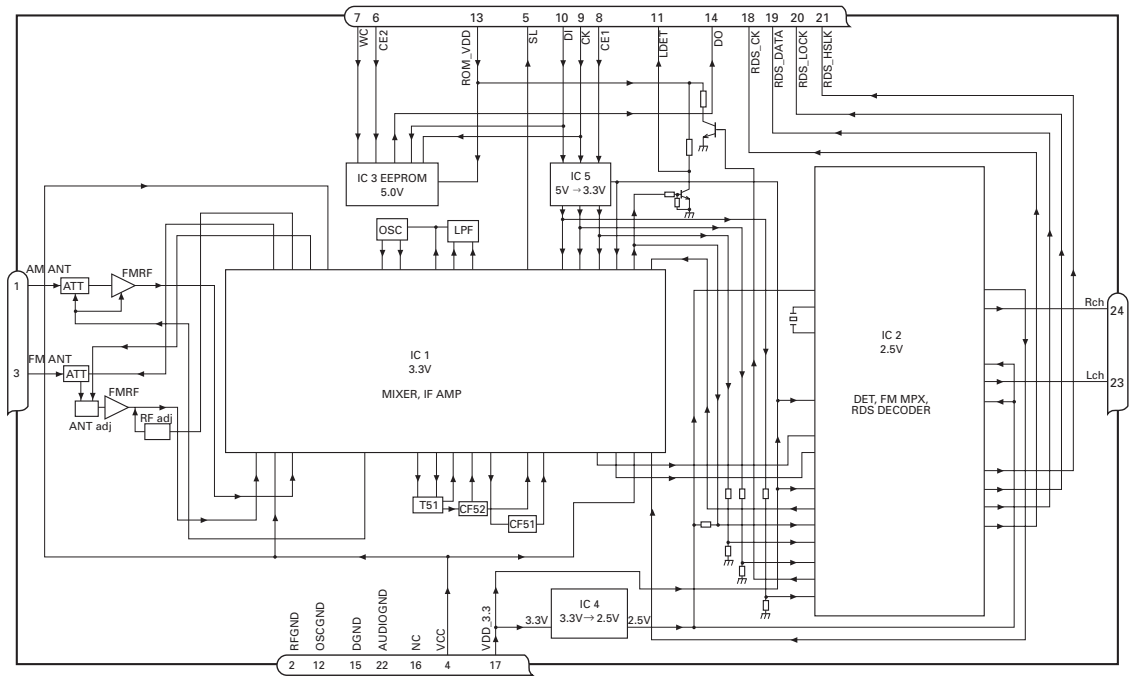


Format	Meaning
C	CMOS

MSM51V4265EP-70TS



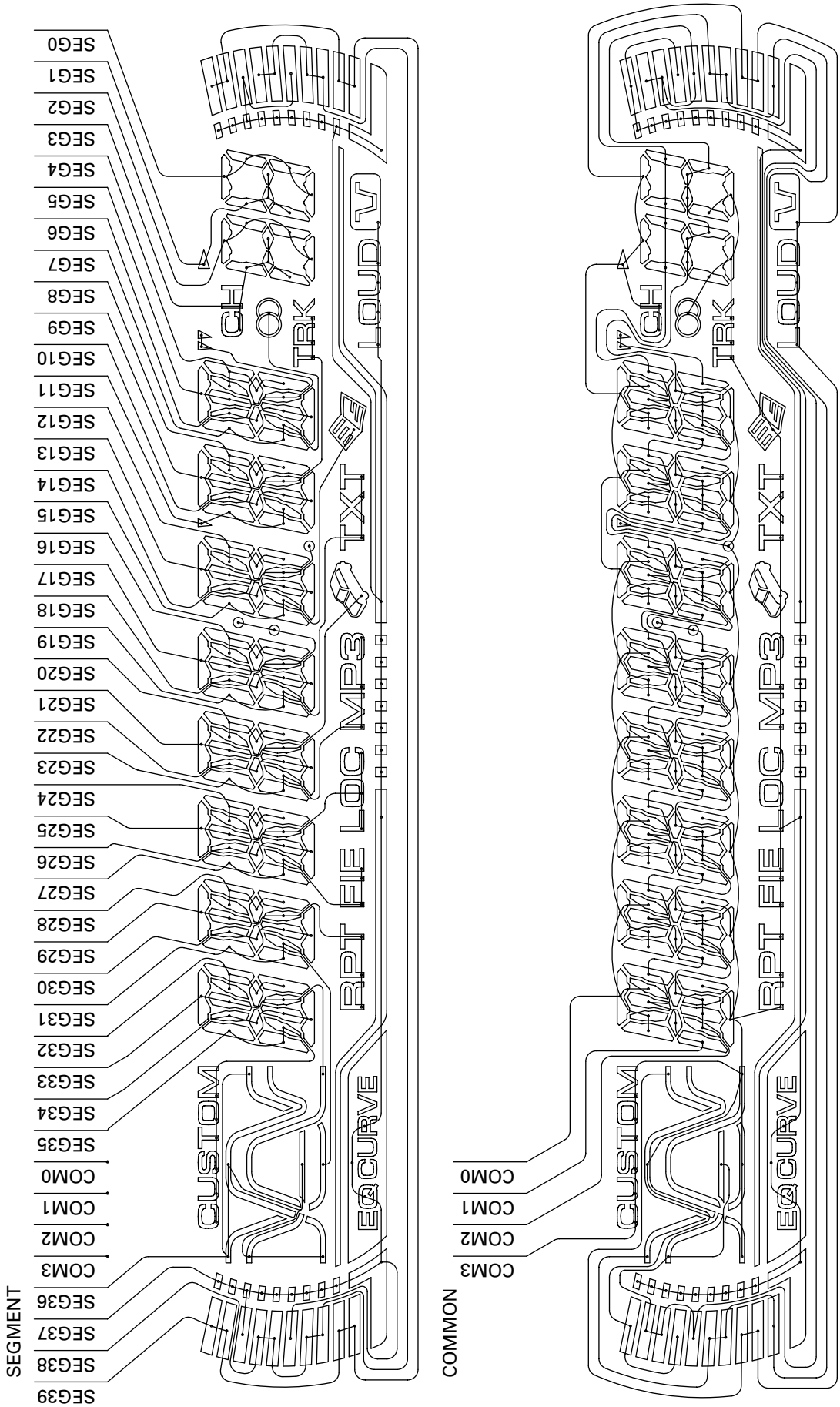
● FM/AM Tuner Unit



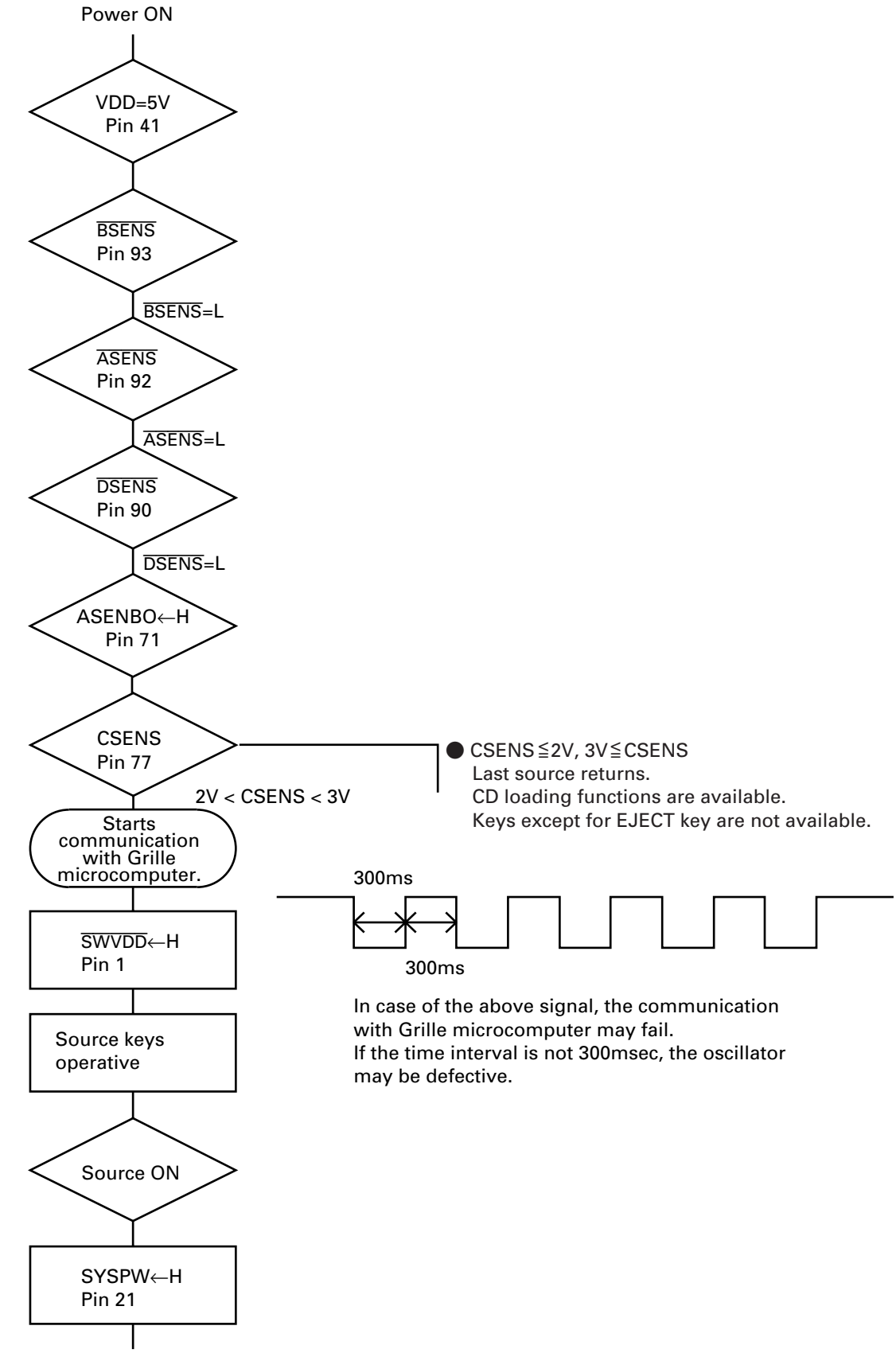
No.	Symbol	I/O	Explain	
1	AMANT	I	AM antenna input	AM antenna input high impedance AMANT pin is connected with an all antenna by way of 4.7μH. (LAU type inductor) A series circuit including an inductor and a resistor is connected with RF ground for the countermeasure against the ham of power transmission line.
2	RFGND		RF ground	Ground of antenna block
3	FMANT	I	FM antenna input	Input of FM antenna 75Ω Surge absorber(DSP-201M-S00B) is necessary.
4	VCC		power supply	The power supply for analog block. D.C 8.4V ± 0.3V
5	SL	O	signal level	Output of FM/AM signals level
6	CE2	I	chip enable-2	Chip enable for EEPROM "Low" active
7	WC	I	write control	You can write EEPROM, when EEPROM write control is "Low". Ordinary non connection
8	CE1	I	chip enable-1	Chip enable for AF•RF "High" active
9	CK	I	clock	Clock
10	DI	I	data in	Data input
11	LDET	O	lock detector	"Low" active
12	OSCGND		osc ground	Ground of oscillator block
13	ROM_VDD		power supply	Power supply for EEPROM pin 13 is connected with a power supply of micro computer.
14	DO	O	data out	Data output
15	DGND		digital ground	Ground of digital block
16	NC		non connection	Not used
17	VDD_3.3		power supply	The power supply for digital block. 3.3V ± 0.2V
18	RDS_CK	O	RDS clock	Output of RDS clock(2.5V)
19	RDS_DATA	O	RDS data	Output of RDS data(2.5V)
20	RDS_LOCK	O	RDS lock	Output unit "High" active(2.5V) (RDS_LOCK turns over by the external transistor. "Low" active)
21	RDS_HSLK	O	RDS high speed lock	Output unit "High" active(2.5V)(RDS_HSLK turns over by the external transistor. "Low" active)
22	AUDIOGND		audio ground	Ground of audio block
23	L ch	O	L channel output	FM stereo "L-ch" signal output or AM audio output
24	R ch	O	R channel output	FM stereo "R-ch" signal output or AM audio output

7.2.2 DISPLAY

● **LCD (CAW1757)**



7.3 OPERATIONAL FLOW CHART



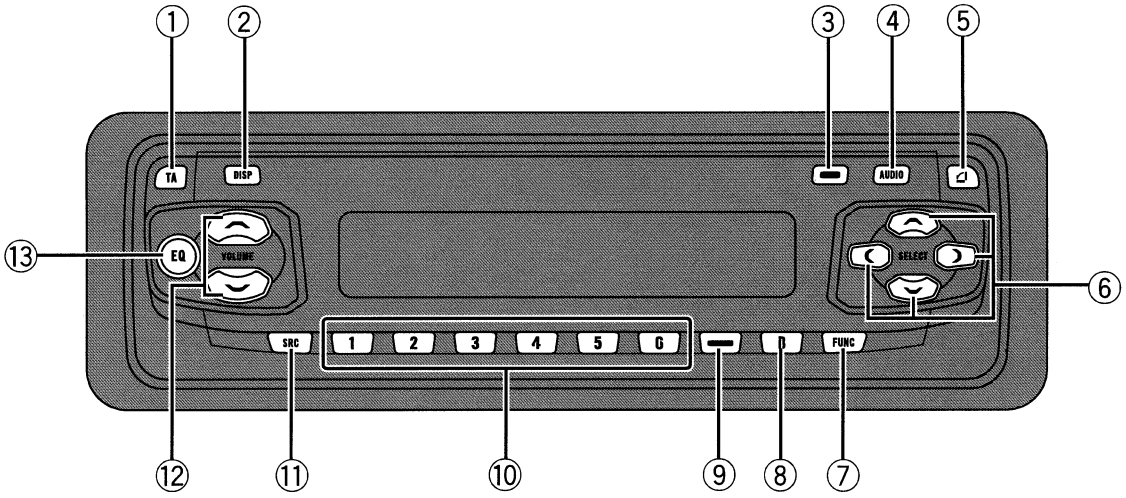
Completes power-on operation.
(After that, proceed to each source operation)

7.4 CLEANING

Before shipping out the product, be sure to clean the following portions by using the prescribed cleaning tools:

Portions to be cleaned	Cleaning tools
CD pickup lenses	Cleaning liquid : GEM1004 Cleaning paper : GED-008

8. OPERATIONS



Head unit

① **TA button**
Press to turn traffic announcements function on or off.
Press and hold to turn NEWS function on or off.

② **DISPLAY button**
Press to select different displays.

③ **PAUSE button**
Press to turn pause on or off.

④ **AUDIO button**
Press to select various sound quality controls.

⑤ **OPEN button**
Press to open the front panel.

⑥ **▲/▼/◄/► buttons**
Press to do manual seek tuning, fast forward, reverse and track search controls.
Also used for controlling functions.

⑦ **FUNCTION button**
Press to select functions.

⑧ **BAND button**
Press to select among three FM and MW/LW bands and cancel the control mode of functions.

⑨ **LOUDNESS button**
Press to turn loudness on or off.

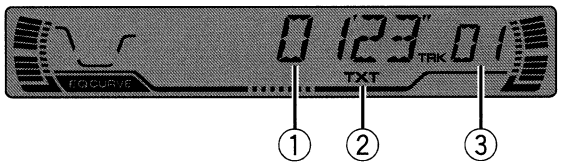
⑩ **1–6 buttons**
Press for preset tuning and disc number search when using a multi-CD player.

⑪ **SOURCE button**
This unit is turned on by selecting a source.
Press to cycle through all of the available sources.

⑫ **VOLUME**
Press to increase or decrease the volume.

⑬ **EQ button**
Press to select various equalizer curves. ▣

Playing a CD



These are the basic steps necessary to play a CD with your built-in CD player.

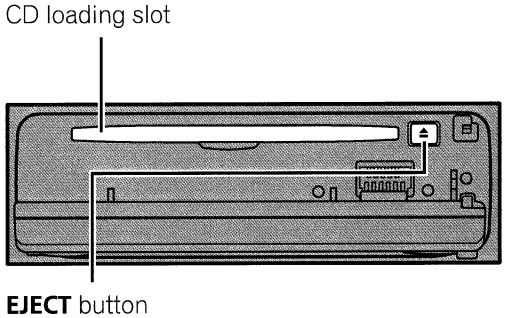
① Play time indicator
Shows the elapsed playing time of the current track.

② TXT indicator
Shows when a CD TEXT is inserted.

③ Track number indicator
Shows the track currently playing.

1 Press OPEN to open the front panel.
CD loading slot appears.
- After a CD has been inserted, press **SOURCE** to select the built-in CD player.

2 Insert a CD into the CD loading slot.
Playback will automatically start.



- You can eject a CD by pressing **EJECT**.
- To avoid a malfunction, make sure that no metal object comes into contact with the terminals when the front panel is open.

3 Close the front panel.

4 Use VOLUME to adjust the sound level.
Press to increase or decrease the volume.

5 To perform fast forward or reverse, press and hold ◄ or ►.
- If you select the search method to **ROUGH**, pressing and holding ◄ or ► enables you to search every ten track in the current disc.

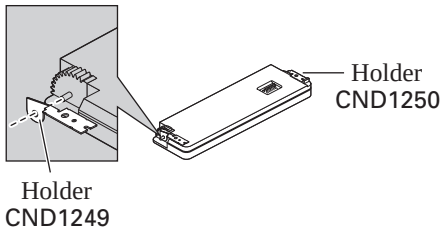
6 To skip back or forward to another track, press ◄ or ►.
Pressing ► skips to the start of the next track. Pressing ◄ once skips to the start of the current track. Pressing again will skip to the previous track.

Notes
- The built-in CD player plays one, standard, 12-cm or 8-cm (single) CD at a time. Do not use an adapter when playing 8-cm CDs.
- Do not insert anything other than a CD into the CD loading slot.
- If you cannot insert a disc completely or if after you insert a disc the disc does not play, check that the label side of the disc is up. Press **EJECT** to eject the disc, and check the disc for damage before inserting the disc again.
- If the built-in CD player does not operate properly, an error message such as **ERROR-11** may be displayed.

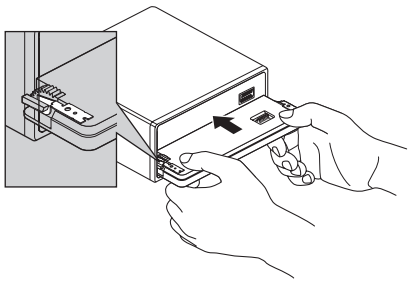
Fixing the Front Panel

If you do not operate the Detaching and Replacing the Front Panel Function, use the supplied fixing screws and fix the front panel to this unit.

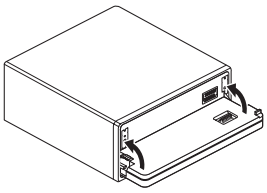
1. Attach the holders to both sides of the front panel.



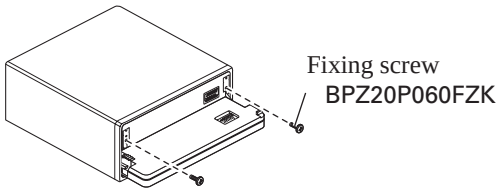
2. Replace the front panel to the unit.



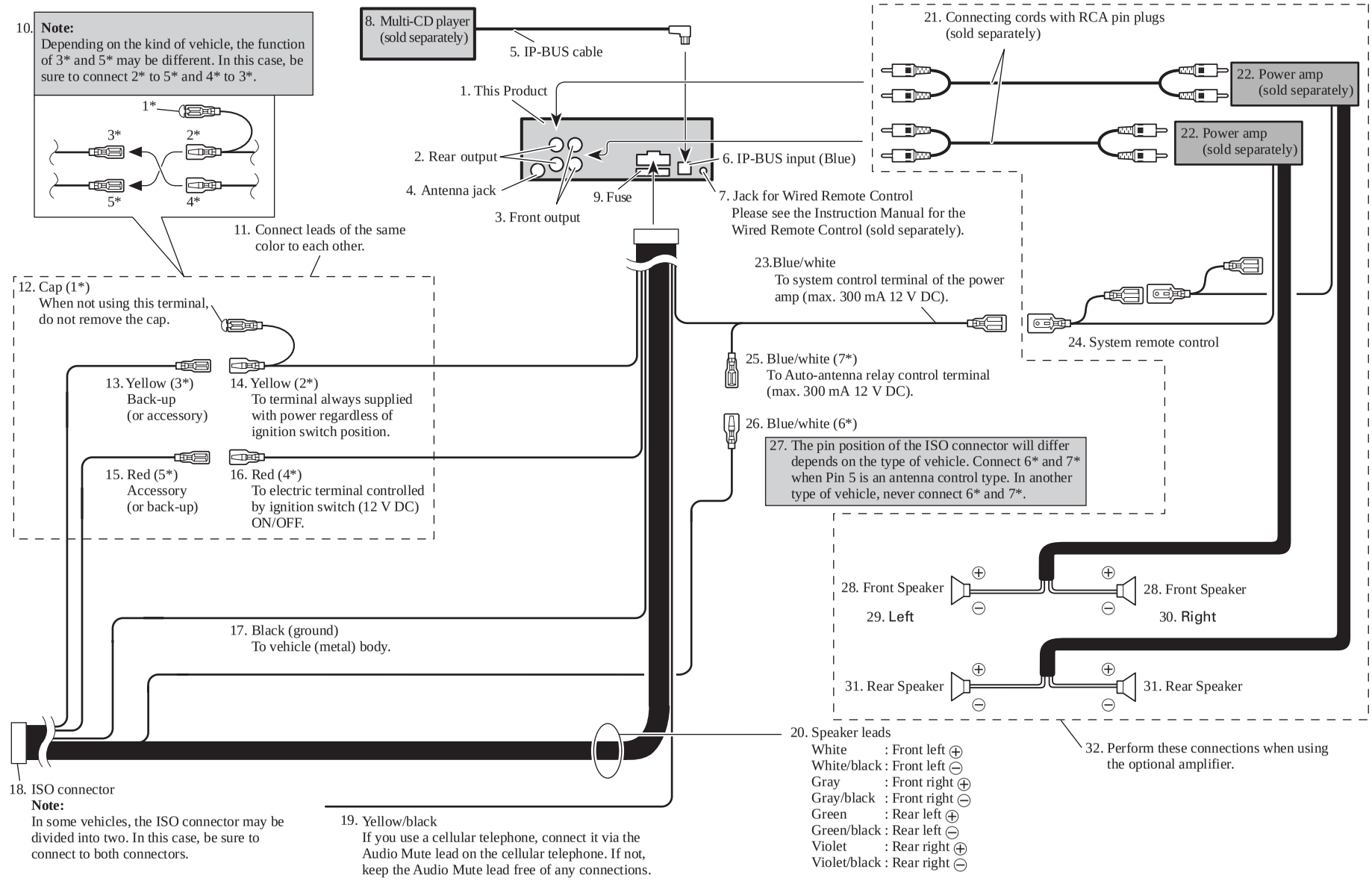
3. Flip the holders into upright positions.



4. Fix the front panel to the unit using fixing screws.



CONNECTION DIAGRAM


10. Note:
Depending on the kind of vehicle, the function of 3* and 5* may be different. In this case, be sure to connect 2* to 5* and 4* to 3*.
1*
2*
3*
4*
5*
11. Connect leads of the same color to each other.
8. Multi-CD player (sold separately)
5. IP-BUS cable
1. This Product
2. Rear output
3. Front output
4. Antenna jack
6. IP-BUS input (Blue)
7. Jack for Wired Remote Control
Please see the Instruction Manual for the Wired Remote Control (sold separately).
9. Fuse
21. Connecting cords with RCA pin plugs (sold separately)
22. Power amp (sold separately)
22. Power amp (sold separately)
23.Blue/white
To system control terminal of the power amp (max. 300 mA 12 V DC).
24. System remote control
25. Blue/white (7*)
To Auto-antenna relay control terminal (max. 300 mA 12 V DC).
26. Blue/white (6*)
27. The pin position of the ISO connector will differ depends on the type of vehicle. Connect 6* and 7* when Pin 5 is an antenna control type. In another type of vehicle, never connect 6* and 7*.
12. Cap (1*)
When not using this terminal, do not remove the cap.
13. Yellow (3*)
Back-up
(or accessory)
14. Yellow (2*)
To terminal always supplied with power regardless of ignition switch position.
15. Red (5*)
Accessory
(or back-up)
16. Red (4*)
To electric terminal controlled by ignition switch (12 V DC) ON/OFF.
17. Black (ground)
To vehicle (metal) body.
28. Front Speaker
29. Left
28. Front Speaker
30. Right
31. Rear Speaker
31. Rear Speaker
32. Perform these connections when using the optional amplifier.
20. Speaker leads
White : Front left ⊕
White/black : Front left ⊖
Gray : Front right ⊕
Gray/black : Front right ⊖
Green : Rear left ⊕
Green/black : Rear left ⊖
Violet : Rear right ⊕
Violet/black : Rear right ⊖
18. ISO connector
Note:
In some vehicles, the ISO connector may be divided into two. In this case, be sure to connect to both connectors.
19. Yellow/black
If you use a cellular telephone, connect it via the Audio Mute lead on the cellular telephone. If not, keep the Audio Mute lead free of any connections.

Pioneer sound.vision.soul

Service Manual

ORDER NO.
CRT3026

CD MECHANISM MODULE(S10MP3)

CX-3057

- **This service manual describes the operation of the CD mechanism module incorporated in models listed in the table below.**
- **When performing repairs use this manual together with the specific manual for model under repair.**

Model	Service Manual	CD Mechanism Module
DEH-P450MP/XM/UC DEH-P4500MP/XM/UC DEH-P3550MP/XM/ES	CRT3019	CXK5660
DEH-P3500MP/XM/EW	CRT3020	
DEH-P550MP/XN/UC DEH-P5500MP/XN/UC DEH-P5550MP/XN/ES	CRT3002	CXK5661
DEH-P5530MP/XN/EW DEH-P5500MP/XN/EW	CRT3003	

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PIONEER CORPORATION 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153-8654, Japan
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K-ZZA. FEB. 2003 Printed in Japan

1. CIRCUIT DESCRIPTIONS

Recently, most CD LSI's have included DAC, RF amplifier and other peripheral circuits, as well as the core circuit DSP. This series of mechanisms employ a multi-task LSI UPD63760GJ, which has CD-ROM decoder and MP3 decoder in addition to the CD block as shown in the Fig.1.0.1. This enables to reproduce a CD-ROM where MP3 data is recorded.

Plus, in this lineup, there are WMA supported models available where WMA decoder UPD61002GC is added.
CXK5660 --- WMA non-supported
CXK5661 --- WMA supported

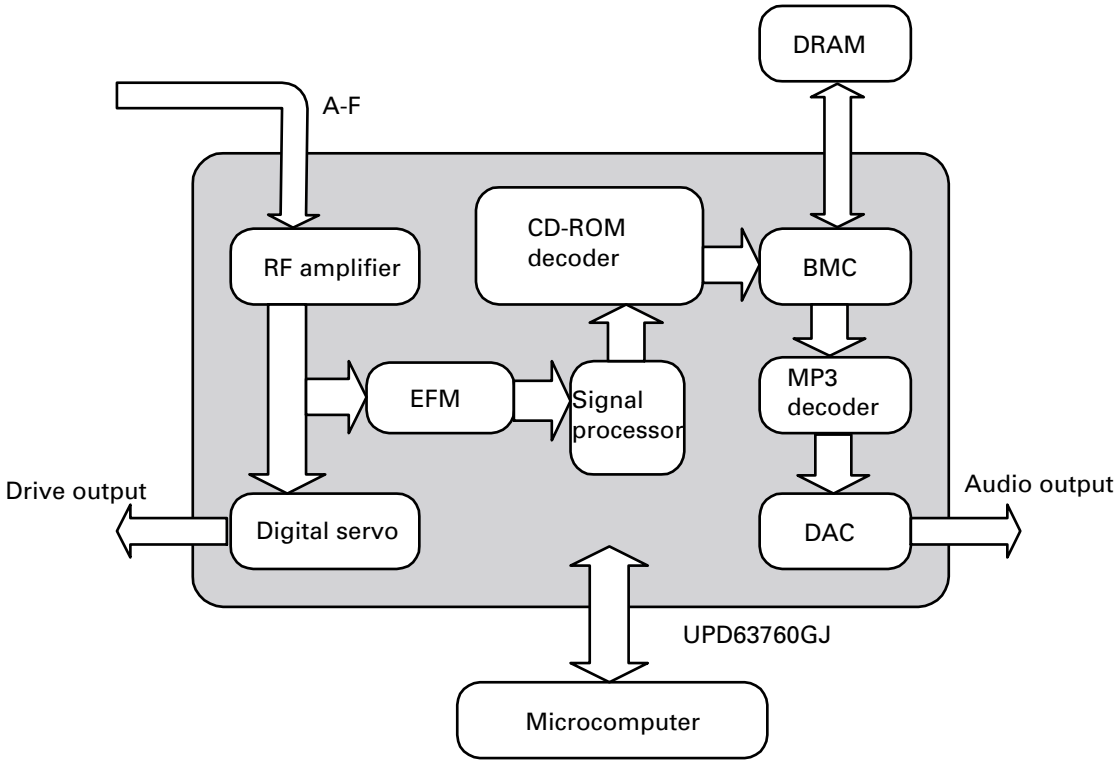


Fig.1.0.1 Block diagram of CD LSI UPD63760GJ

1.1 PREAMPLIFIER BLOCK (UPD63760GJ: IC201)

In the preamplifier block, the pickup output signals are processed to generate signals that are used for the next-stage blocks: the servo block, demodulator, and control.

After I/V-converted by the preamplifier with built-in photo detectors (inside the pickup), the signals are applied to the preamplifier block in the CD LSI UPD63760GJ (IC201). After added by the RF amplifier in this block, these signals are used to produce necessary signals such as RF, FE, TE, and TE zero-cross signals.

The CD LSI employs a single power supply system of + 3.3V. Therefore, the REFO (1.65V) is used as the reference voltage both for this CD LSI and the pickup. The LSI produces the REFO signal by using the REFOUT via the buffer amplifier and outputs from the pin 131. All the measurements should be made based on this REFO.

Caution: Be careful not to short the REFO and GRD when measuring.

1.1.1 APC (Automatic Power Control)

A laser diode has extremely negative temperature characteristics in optical output at constant-current drive. To keep the output constant, the LD current is controlled by monitor diodes. This is called the APC circuit. The LD current is calculated at about 30mA, which is the voltage between LD1 and V3R3D divided by 7.5 (ohms).

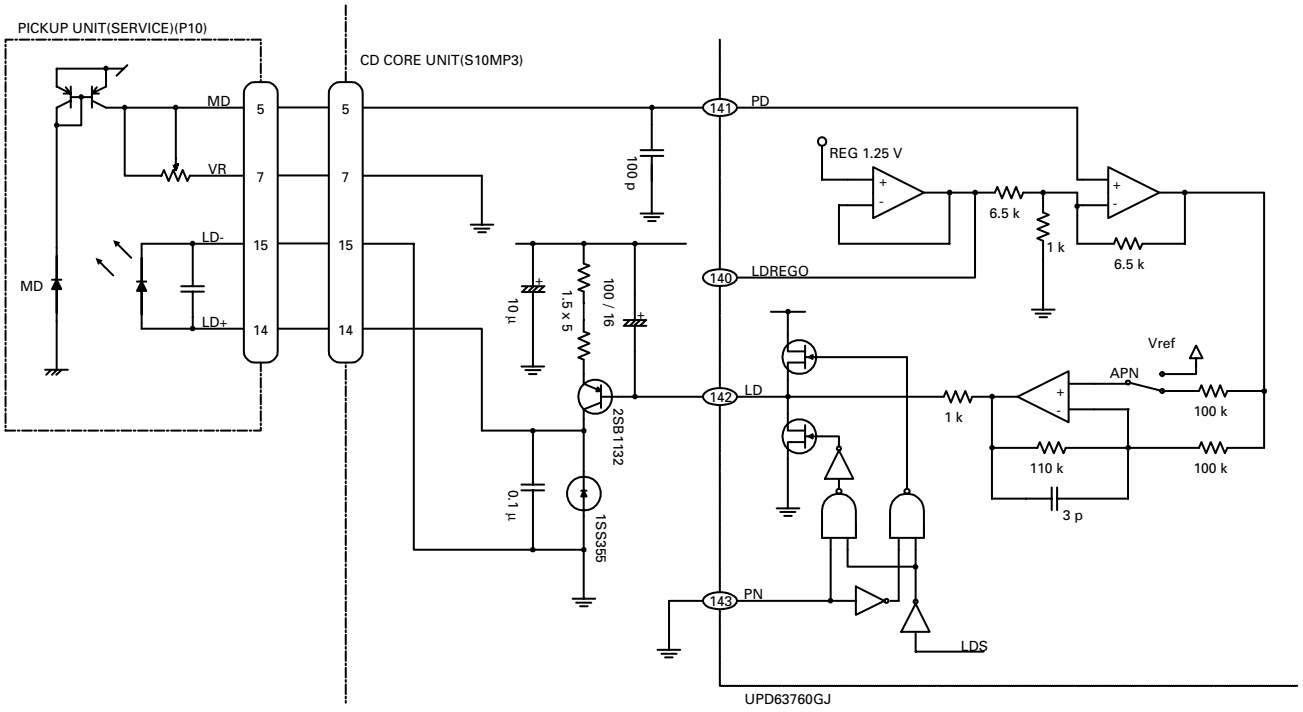


Fig. 1.1.1 APC

1.1.2 RF and RFAGC amplifiers

The photo-detector outputs (A + C) and (B + D) are added, amplified, and equalized inside this LSI, and then provided as the RF signal from the RFI terminal. The RF signal can be used for eye-pattern check.

The low frequency component of the RFO voltage is:

RFO = (A + B + C + D) x 2

The RFO is used for the FOK generation circuit and RF offset adjustment circuit.

The RFI output from the pin 118 is A/C-coupled outside this LSI, and returned to the pin 117 of this LSI. The signal is amplified in the RFAGC amplifier to obtain the RFAGC signal. This LSI is equipped with the RFAGC auto-adjustment function as explained below. This function automatically controls the RFO level to keep at 1.5V by switching the feed-back gain for the RFAGC amplifier.

The RFO signal is also used for the EFM, DFCT, MIRR, and RFAGC auto-adjustment circuits.

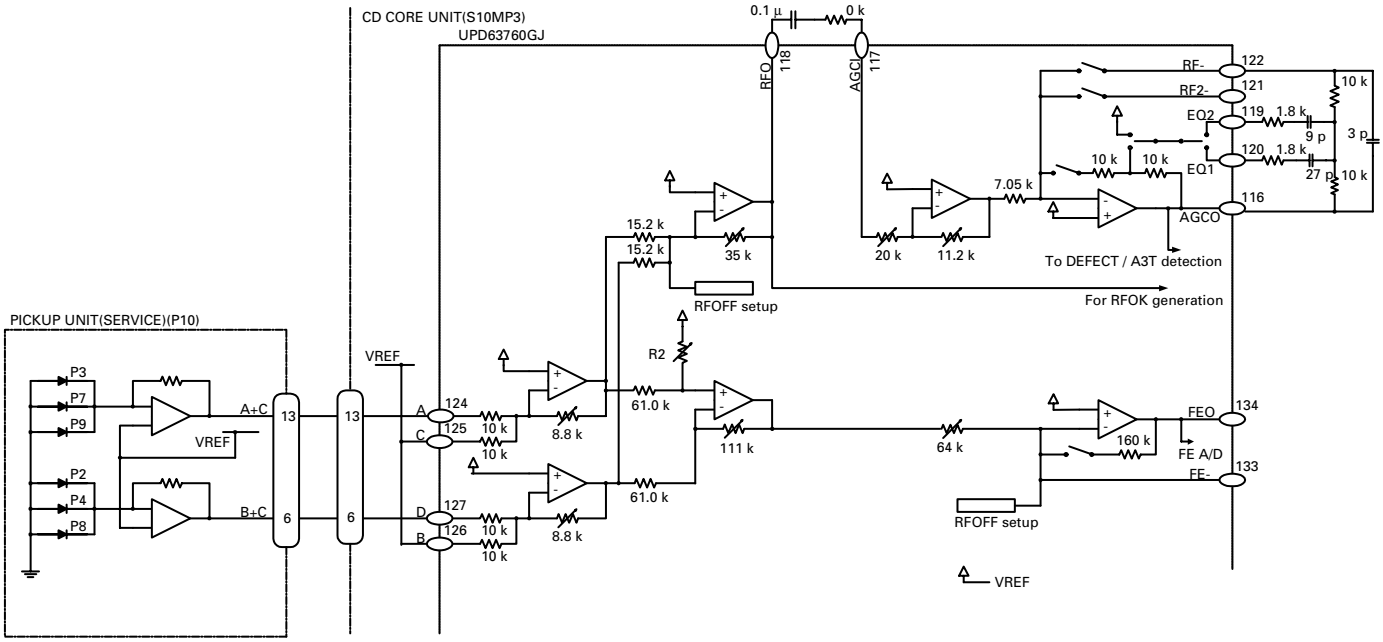


Fig. 1.1.2 RF/AGC/FE

1.1.3 Focus error amplifier

The photo-detector outputs (A + C) and (B + D) are applied to the differential amplifier and the error amplifier to obtain the (A + C - B - D) signal, which is then provided from the pin 91 as the FE signal.
The low frequency component of the FE voltage is:
FE = (A + C - B - D) x 8.8/10k x 111k/61k x 160k/64k
= (A + C - B - D) x 6.0
The FE output shows 1.5Vp-p S-shaped curve based on the REFO. For the next-stage amplifiers, the cutoff frequency is 14.6kHz.

1.1.4 RFOK

The RFOK circuit generates the RFOK signal, which indicates focus-close timing and focus-close status during the play mode, and outputs from the pin 53. This signal is shifted to "H" when the focus is closed and during the play mode.
The DC level of the RFI signal is peak-held in the digital block and compared with a certain threshold level to generate the RFOK signal. Therefore, even on a non-pit area or a mirror-surface area of a disc, the RFOK becomes "H" and the focus is closed.
This RFOK signal is also applied to the microcomputer via the low-pass filer as the FOK signal, which is used for protection and RF amplifier gain switching.

1.1.5 Tracking error amplifier

The photo-detector outputs E and F are applied to the differential amplifier and the error amplifier to obtain the (E - F) signal, and then provided from the pin 136 as the TE signal.
The low frequency component of the TE voltage is:
TEO = (E - F) x 160k/112k x 81k/45.4k x 160k/80k
= (E - F) x 5.1
The TE output provides the TE waveform of about 1.3Vp-p based on the REFO. For the next-stage amplifiers, the cutoff frequency is 21.1kHz.

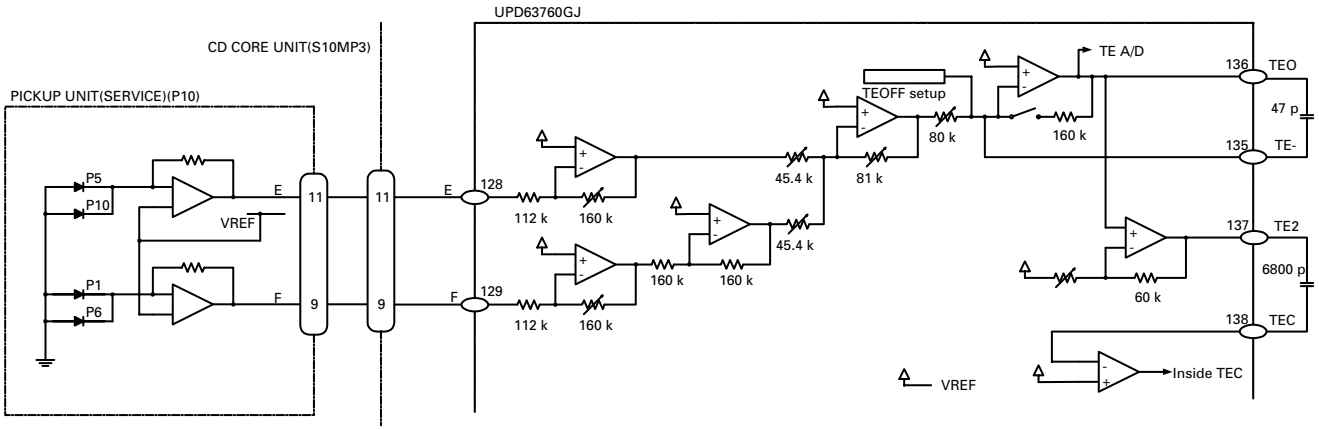


Fig. 1.1.3 TE

1.1.6 Tracking zero-cross amplifier

The tracking zero-cross signal (hereinafter TEC signal) is obtained by amplifying the TE signal 4 times, and used to detect the tracking-error zero-cross point.

By using the information on this point, the following two operations can be performed:

1. Track counting in the carriage move and track jump modes
2. Sensing the lens-moving direction at the moment of the tracking close (The sensing result is used for the tracking brake circuit as explained below.)

The frequency range of the TEC signal is between 300Hz and 20kHz.

TEC voltage = TE level x 4

The TEC level can be calculated at 5.2V. This level exceeds the D range of the operational amplifier, and the signal gets clipped. However, it can be ignored because the CD LSI only uses the signal at the zero-cross point.

1.1.7 EFM

The EFM circuit converts the RF signal into a digital signal expressed in binary digits 0 and 1. The AGCO output from the pin 116 is A/C-coupled in the peripheral circuit, fed back to the LSI from the pin 115, and sent to the EFM circuit inside the LSI.

On scratched or dirty discs, part of the RF signal recorded may be missing. On other discs, part of the RF signal recorded may be asymmetric, which was caused by dispersion in production quality. Such lack of information cannot be completely eliminated by this AC coupling process. Therefore, by utilizing the fifty-fifty occurrence ratio of binary digits (0 and 1) in the EFM signal, the EFM comparator reference voltage ASY is controlled, so that the comparator level always stays around the center of the RFO signal. The reference voltage ASY is made from the EFM comparator output via the low-pass filter. The EFM signal is put out from the pin 111.

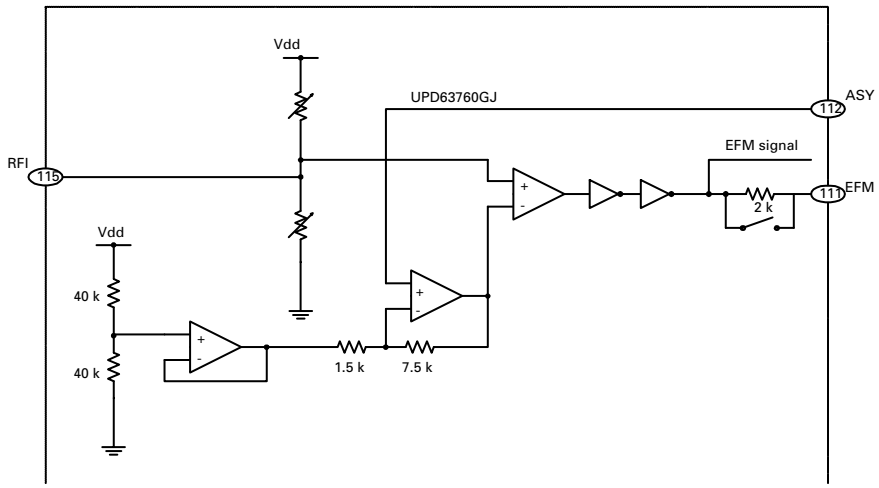


Fig. 1.1.4 EFM

1.2 SERVO BLOCK (UPD63760GJ: IC201)

The servo block controls the servo systems for error signal equalizing, in-focus, track jump and carriage move and so on. The DSP block is a signal-processing block, where data decoding, error correction, and compensation are performed.

After A/D-converted, the FE and TE signals (generated in the preamplifier block) are applied to the servo block and used to generate the drive signals for the focus, tracking, and carriage servos.

The EFM signal is decoded in the DSP block, and finally sent out as the audio signal after D/A-converted. In this decoding process, the spindle servo error signal is generated, supplied to the spindle servo block, and used to generate the spindle drive signal.

The drive signals for focus, tracking, carriage, and spindle servos (FD, TD, SD, and MD) are provided as PWM3 data, and then converted to the analog data by the low-pass filter which uses the operational amplifier embedded in the driver IC BA5996FM (IC301). These analog drive signals can be monitored by the FIN, TIN, CIN, and SIN signals respectively. Afterwards, the signals are amplified and applied to each servo's actuator and motor.

1.2.1 Focus servo system

In the focus servo system, the digital equalizer block works as its main equalizer. The figure 1.2.1 shows the block diagram of the focus servo system.

To close the focus loop circuit, the lens should be moved to within the in-focus range. While moving the lens up and down by using the focus search triangular signal, the system tries to find the in-focus point. In the meantime, the spindle motor rotation is kept at the prescribed one by using the kick mode.

The servo LSI monitors the FE and RFOK signals and automatically performs the focus close operations at an appropriate timing. The focus loop will close when the following three conditions are satisfied at the same time:

1) The lens moves toward the disc surface.
2) The RFOK signal is shifted to "H".
3) The FE signal is zero-crossed. At last, the FE signal comes to the zero level (or REFO).

When the focus loop is closed, the FSS bit is shifted from "H" to "L". The microcomputer starts monitoring the RFOK signal obtained through the low-pass filter 10msec after that.

If the RFOK signal is detected as "L", the microcomputer will take several actions including protection.

The timing chart for focus close operations is shown in fig. 1.2.2.

In the test mode, the S-shaped curve, search voltage, and actual lens movement can be confirmed by pressing the focus close button when the focus mode selector displays 01.

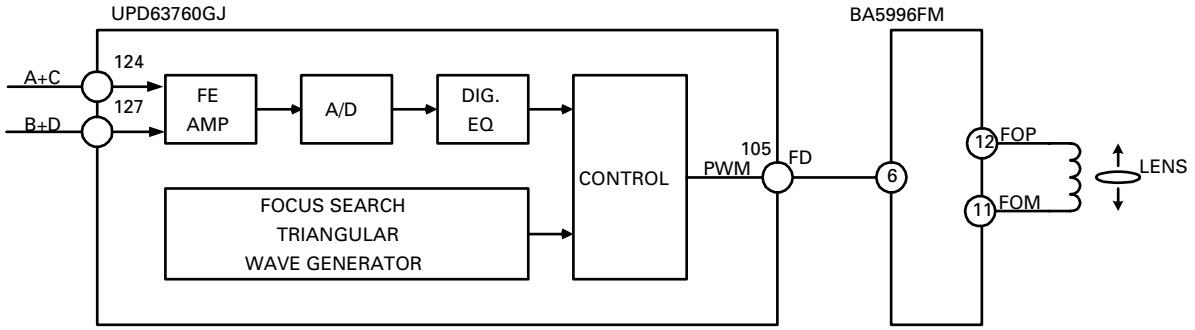


Fig. 1.2.1 Block diagram of the focus servo system

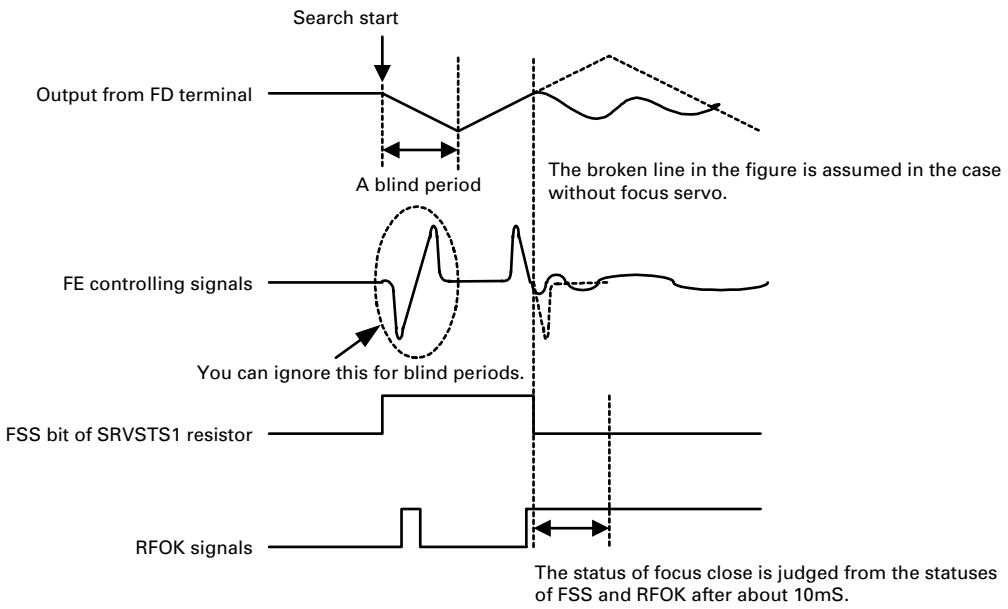

Search start
Output from FD terminal
A blind period
The broken line in the figure is assumed in the case without focus servo.
FE controlling signals
You can ignore this for blind periods.
FSS bit of SRVSTS1 resistor
RFOK signals
The status of focus close is judged from the statuses of FSS and RFOK after about 10mS.

Fig. 1.2.2 Timing chart for focus close operations

1.2.2 Tracking servo system

In the tracking servo system, the digital equalizer block is used as its main equalizer. The figure 1.2.3 shows the block diagram of the tracking servo system.

(a) Track jump

Track jump operation is automatically performed by the auto-sequence function inside the LSI with a command from the microcomputer. In the search mode, the following five track jump modes are available: 1, 4, 10, 32, and 32*3

In the test mode, 1, 32, and 32*3 track jump modes, and carriage move mode are available and can be switched by selecting the mode.

For track jumps, first, the microcomputer sets about half the number of tracks to be jumped as the target. (Ex. For 10 track jumps, it should be 5 or so.) Using the TEC signal, the microcomputer counts up tracks. When the counter reaches the target set by the microcomputer, a brake pulse is sent out to stop the lens. The pulse width is determined by the microcomputer. Then, the system closes the tracking loop and proceeds to the normal play. At this moment, to make it easier to close the tracking loop, the brake circuit is kept ON for 50msec after the brake pulse, and the tracking servo gain is increased.

In the normal operation mode, the FF/REW operation is realized by continuously repeating single jumps about 10 times faster than the normal single jump operation.

(b) Brake circuit

The brake circuit stabilizes the servo-loop close operation even under poor conditions, especially in the setting-up mode or track jump mode. This circuit detects the lens-moving direction and emits only the drive signal for the opposite direction to slow down the lens. Thus, this makes it easier to close the tracking servo loop. The off-track direction is detected from the phases of the TEC and MIRR signals.

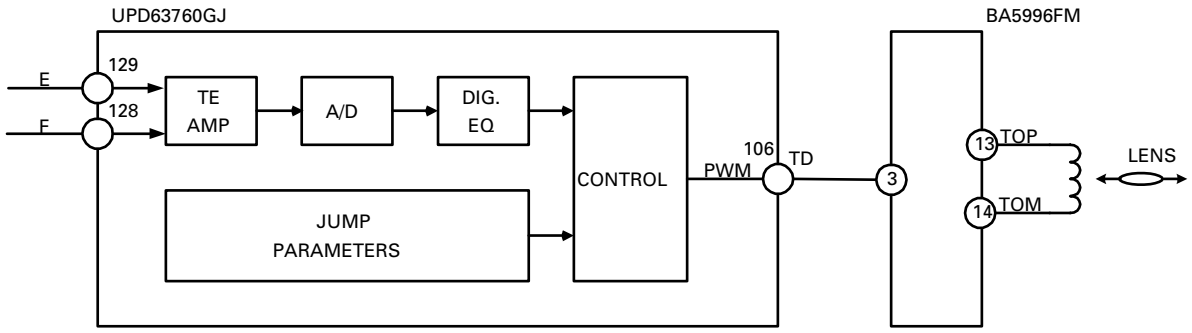


Fig. 1.2.3 Block diagram of the tracking servo system

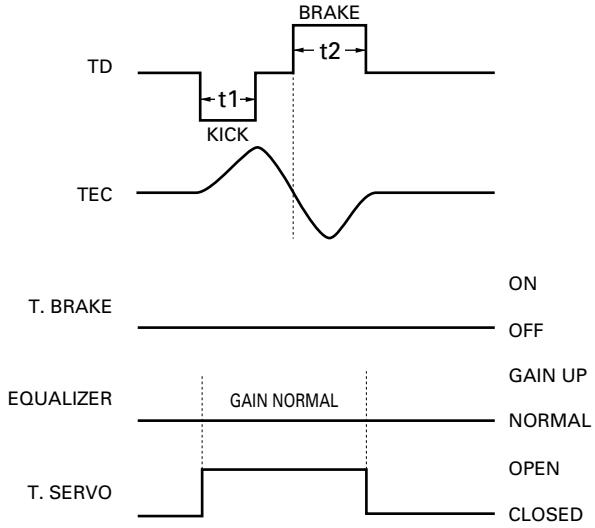


Fig. 1.2.4 Single-track jump

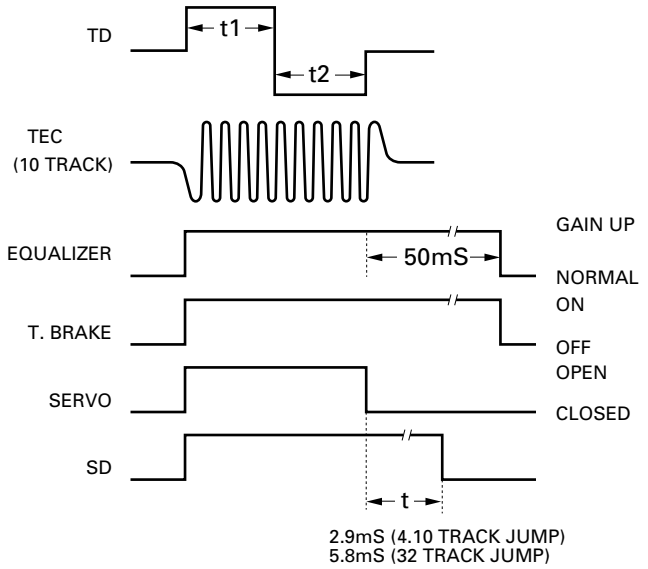
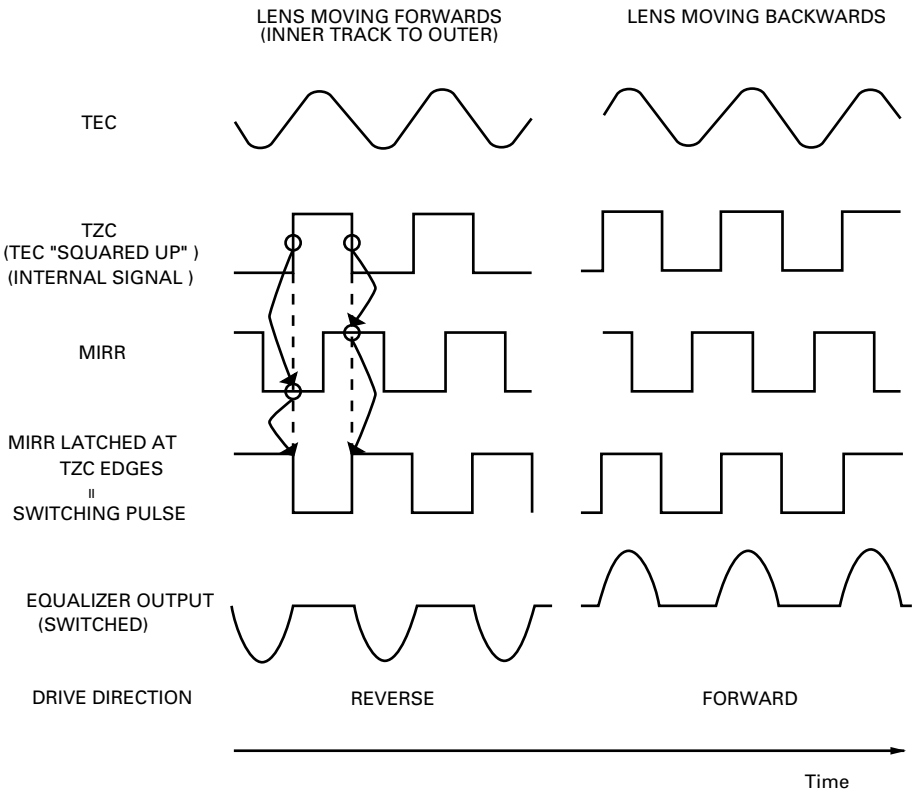


Fig. 1.2.5 Multi-track jump



Note : Equalizer output assumed to hava same phase as TEC.

Fig. 1.2.6 Track brake

1.2.3 Carriage servo system

In the carriage servo system, the low frequency component from the tracking equalizer (the information on the lens position) is transferred to the carriage equalizer, where the gain is increased to a certain level, and then sent out from the LSI as the carriage drive signal. This signal is applied to the carriage motor via the driver IC.

During the play mode, when the lens offset reaches a certain level, it is necessary to move the pickup toward the FORWARD direction. The equalizer gain is adjusted so that the output over the carriage motor starting voltage is sent out in such a case. In actual operations, only when the equalizer output exceeds the threshold level preset in the servo LSI, the drive signal is sent out. This can reduce the consumption power.

With an eccentric disc loaded, before the whole pickup starts moving, the equalizer output may exceed the threshold level a few times. In this case, the drive signal applied from the LSI shows pulse-like waveforms.

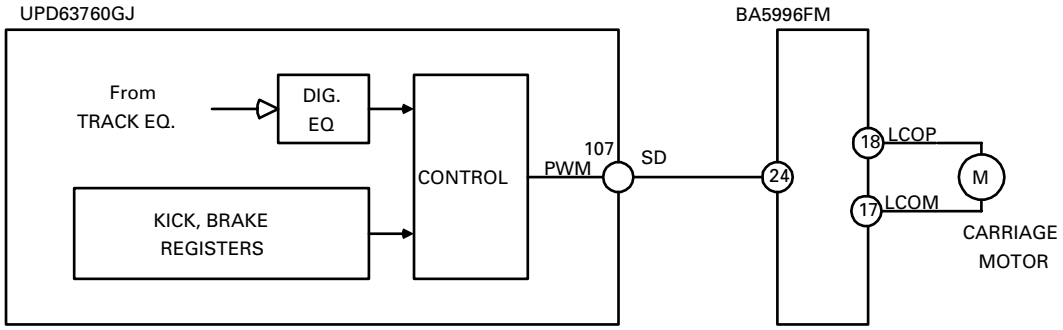


Fig. 1.2.7 Block diagram for the carriage servo block

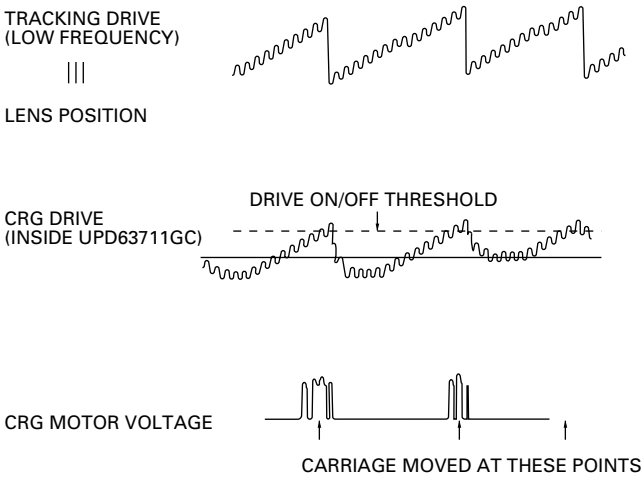


Fig. 1.2.8 Waveforms of the carriage signal

1.2.4 Spindle servo system

In the spindle servo system, the following seven modes are available:

1) Kick

Used to accelerate the disc rotation in the setting-up mode.

2) Offset

a. Used in the setting-up mode until the AGC completes after the kick mode.

b. Used when the focus loop is unlocked during the play mode and until it is locked again.

In both cases, the mode is to keep the disc rotation near to the appropriate one.

3) Applicable servo

In the normal operation, the CLV servo mode is used.

The EFM demodulation block detects through WFCK/16 sampling whether or not the frame sync signal and the internal frame counter output are synchronized, and generates the status signal based on the sampling result, synchronized or non-synchronized. If eight consecutive "non-sync" signals are obtained, the system senses the status as "non-sync". If not, the system senses as "sync". In the applicable servo mode, the leading-in servo mode is automatically selected at the non-sync status, and the normal servo mode is at the sync status.

4) Brake

Used to stop the spindle motor.

In accordance with the microcomputer's command, the brake voltage is sent out from the servo LSI. At this moment, the EFM waveform is being monitored in this LSI. When the longest EFM pattern exceeds a certain cycle (or the rotation slows down enough), a flag is set inside the LSI, and the microcomputer switches off the brake voltage. If a flag is not set within a certain period, the microcomputer shifts the mode from the brake mode to the stop mode, and keeps this for a certain period. In the eject mode, after the mode is shifted to the stop mode and a certain period passes, the loaded disc is ejected.

5) Stop

Used when the power is turned on and during the eject mode. At this moment, the voltage through the spindle motor is 0V.

6) Rough servo

Used when the carriage is moved (or in the carriage move mode such as long search).

By obtaining the linear velocity from the EFM waveform, "H" or "L" is applied to the spindle equalizer. In the test mode, this mode is used for grating confirmation.

7) Rotation speed

CD-DA and CD-ROM are controlled differently at their rotation speeds. Both of them are done by the double speed in the setting-up mode when a disc gets inserted. However, CD-DA is done by the standard speed in the setting-up mode starting from SOURCE ON/ACC ON with the disc inside, while CD-ROM is still done by the double speed. During the play mode, the rotation speed of CD-DA is always the standard speed, while that of CD-ROM is always the double speed.

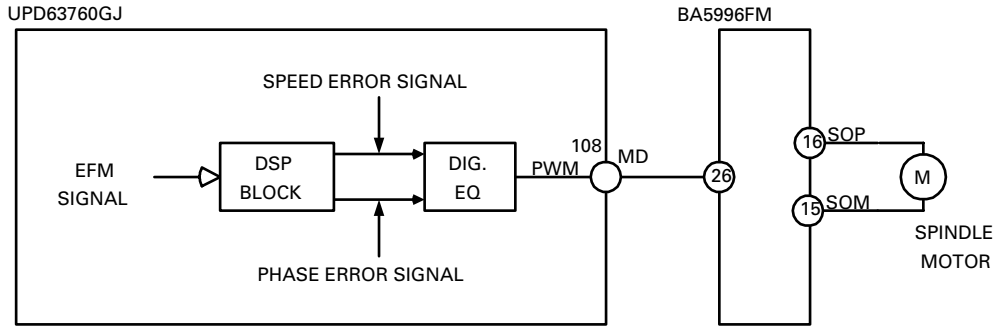


Fig.1.2.9 Block diagram of the spindle servo system

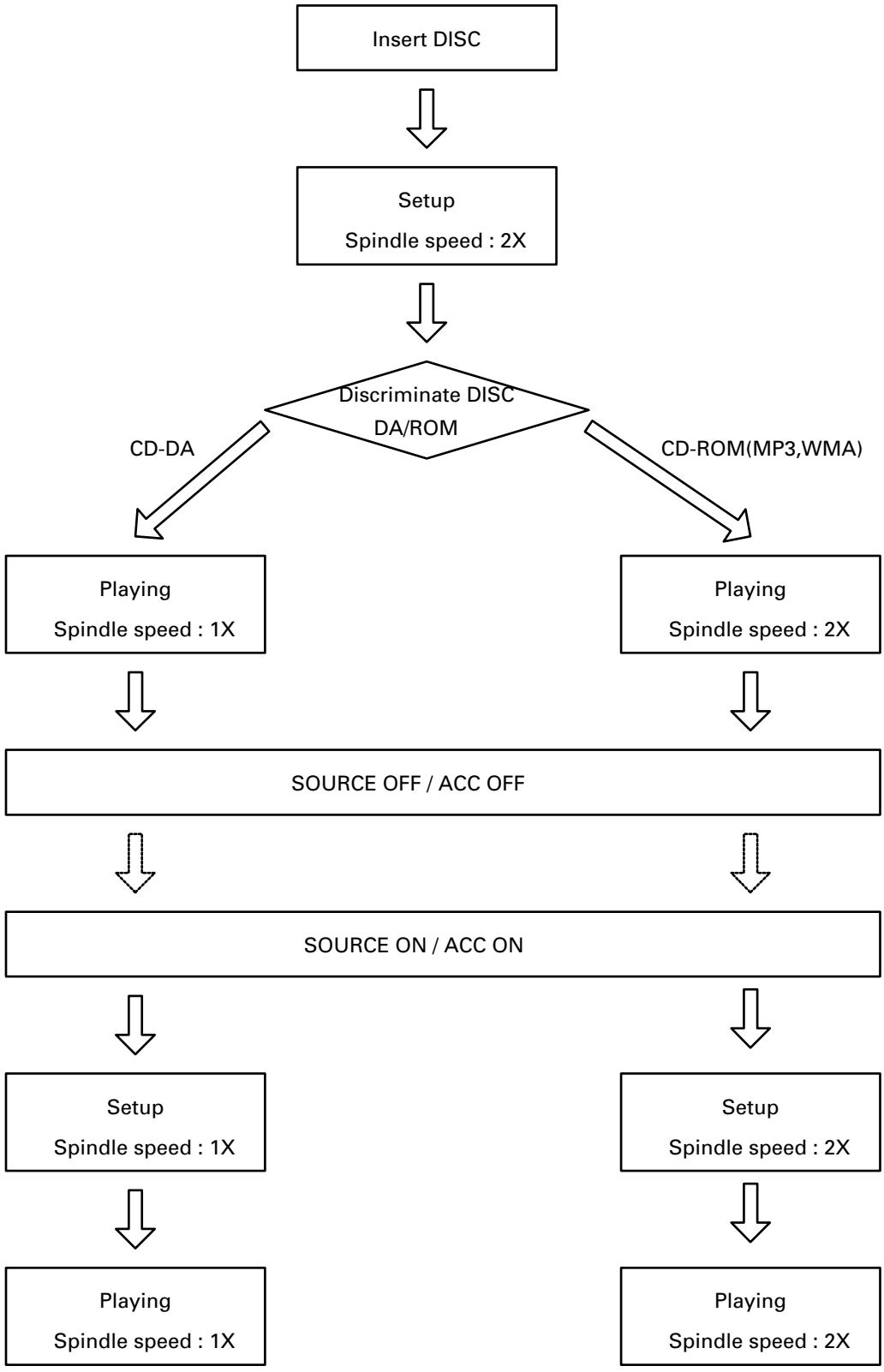


Fig.1.2.10 Dual spindle drive(x1 / x2)

1.3 AUTOMATIC ADJUSTMENT FUNCTION

This system automatically handles the circuit adjustment inside the CD LSI. All adjustments are performed whenever a disc is inserted or the CD mode is selected by pressing the source key. Each adjustment will be explained below.

1.3.1 TE, FE, and RF offset auto-adjustment

This adjustment is made to adjust the offsets of the TE, FE, and RF amplifiers in the preamplifier block to their target values on the basis of the REFO when the power is turned on. (The target values for TE, FE, and RE offsets are 0V, 0V, and -0.8V respectively.)

<Adjusting procedures>

1) With the LD OFF status, the microcomputer reads each offset through the servo LSI.
2) The microcomputer calculates the voltages for correction from the measured values, and inputs the calculated results as the offset adjustment values.

1.3.2 Tracking balance (T.BAL) auto-adjustment

This adjustment is to equalize the pickup output offsets for E-ch and F-ch by changing the amplifier gain inside the LSI. Actually, the gain is adjusted so that the TE waveform becomes symmetrical on each side of the REFO.

<Adjusting procedures>

1) The focus loop is closed.
2) The lens is kicked in the radial direction to make certain that the TE waveform is generated.
3) The microcomputer reads the TE offset calculated in the LSI through the servo LSI.
4) The microcomputer takes either of the following steps depending on the calculated offset:

• When the offset is 0, the adjustment completes.
• When the offset is positive or negative, the amp gains for E-ch and F-ch should be changed.

The steps 2) to 4) are repeatedly taken until the offset becomes 0 or the repeating time reaches the limit frequency.

1.3.3 EF bias auto-adjustment

This adjustment obtains the best focus point during the play mode and maximizes the RFI level by utilizing the phase difference between the 3T level of the RF signal and that of the signal obtained when focus error disturbance is applied to the focus loop. At this moment, the auto-gain control (AGC), where focus error disturbance is applied to the focus and tracking loops, is also performed as explained below.

<Adjusting procedures>

1) The microcomputer transmits the command to apply disturbance component to the focus loop (inside the servo LSI).
2) In the LSI, the 3T-offset component of the RF signal is detected.
3) From the relation between the 3T detected component and the disturbance, the LSI obtains the volume and direction of the focus offset.
4) The microcomputer transmits the command and reads out the detecting result from the servo LSI.
5) The microcomputer calculates the necessary correction and inputs the result as the bias adjustment value to the servo LSI.

The adjusting steps are repeated a few times for higher adjustment accuracy as same as those for the AGC.

1.3.4 Focus and tracking AGC

This function automatically adjusts the focus and tracking servo loop gains.

<Adjusting procedures>

1) Disturbance component is applied to the servo loop.
2) The error signals (FE and TE) are extracted through the band pass filter as the G1 and G2 signals.
3) The microcomputer reads the G1 and G2 signals through the servo LSI.
4) The microcomputer calculates the necessary correction and performs the loop gain adjustment inside the servo LSI.

For higher adjustment accuracy, the above steps are repeated a few times.

1.3.5 RF level auto-adjustment (RFAGC)

This adjustment minimizes the dispersion of the RF level (RFO), which may be caused by disc-related errors, for more stable signal transmission by changing the amp gain between RFI and RFO.

<Adjusting procedures>

1) The microcomputer sends the command to the servo LSI to read out the output from the RF level detecting circuit inside the servo LSI.

2) The microcomputer calculates the appropriate amp gain by using the output read out to adjust the RFO level at the prescribed one.

3) The microcomputer sends the command to the servo LSI to adjust the amp gain into the calculated one.

This adjustment is automatically performed when:

1) During the setting-up mode, only the focus close operation ends.

2) Immediately before the setting-up ends (or right before the play mode starts)

3) During the play mode, the focus loop is locked again after unlocked.

1.3.6 Preamplifier gain adjustment

In this adjustment, when the reflected beams from disc surface are extremely weak (ex. when the lens is dirty, and a CD-RW is loaded), the whole gain in the RFAMP block (FE, TE, and RF amplifiers) is increased by +6dB or +12dB.

<Adjusting procedures>

When the system senses that the reflected beams from disc surface are extremely weak during the setting-up mode, the whole RFAMP gain is increased by +6dB or +12dB.

After the gain is changed, the setting-up mode is restarted.

If the whole RFAMP gain is always increased to the +6dB level in the play mode, the +6dB level will be employed at the starting of the setting-up mode from the next playback.

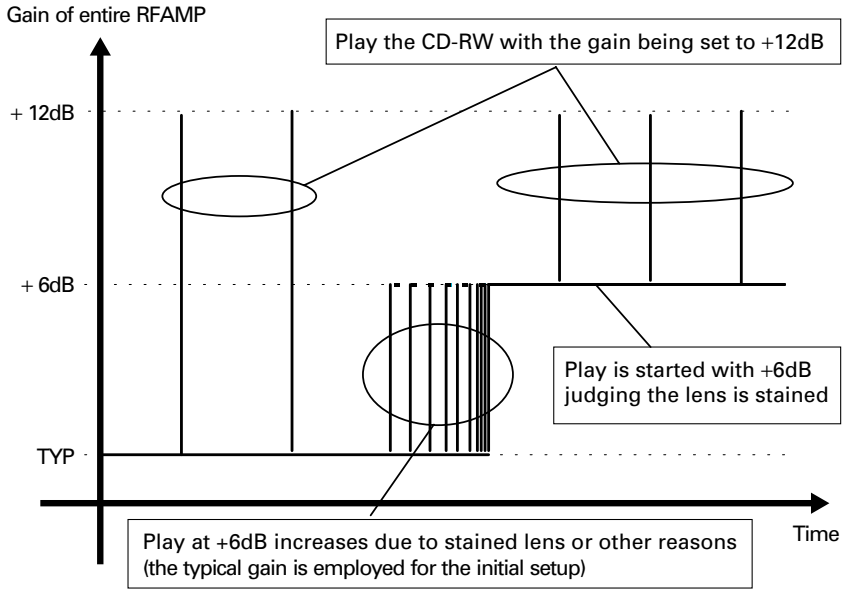

Gain of entire RFAMP
Play the CD-RW with the gain being set to +12dB
+ 12dB
+ 6dB
TYP
Play is started with +6dB
judging the lens is stained
Time
Play at +6dB increases due to stained lens or other reasons
(the typical gain is employed for the initial setup)

Fig.1.3.1 Pre-amp gain adjustment

1.3.7 Initial values in adjustment

For each auto-adjustment, the last adjustment results are basically used as the initial settings of the next adjustment unless the microcomputer is turned off (or the backup is off). When the microcomputer (or the backup) is turned off, the last adjustment results are not used, but the factory settings.

1.3.8 Adjustment result display

For some of the adjustments (FE and RF offset, FZD cancel, F and T gain, and RFAGC), the adjustment results can be displayed and confirmed in the test mode.

1) FE and RF offset

Reference coefficient = 32 ("32" indicates no adjustment required)

The display is expressed in the unit of about 32mV.

Ex. When the FE offset coefficient is 35:

35 - 32 = 3 x 32mV = 96mV

This means that the correction is about +96mV, and the FE offset before adjustment is -96mV.

2) F and T gain adjustment

Reference coefficient for focus and tracking = 20

The displayed coefficient / the reference coefficient indicates the adjusted gain.

Ex. When the AGC coefficient is 40:

40/20 = 2 times (+6dB)

That is, the gain was adjusted by +6dB.

(The original loop gain was half the target one. So, the whole gain was doubled.)

3) RF level adjustment (RFAGC)

Reference coefficient = 8

The coefficient 9 to 15 indicates increasing the RF level.

The coefficient 0 to 7 indicates decreasing the RF level.

When the coefficient display changes by 1, the gain changes by 0.7 to 1dB.

When the coefficient is 15, the gain is maximum or TYP + 6.5dB.

When the coefficient is 0, the gain is minimum or TYP - 6.0dB.

1.4 POWER SUPPLY AND LOADING BLOCK

The VD (8.3 ± 0.5V), the VD2 (5.6 ± 0.5V) and the VDD (5.0 ± 0.25V), which are supplied from the mother PC board, are used for the power supply. In this system, the following four power-supply signals are available: the VD (for the drive system), the V3R3 obtained from the VD2 via the 3.3V regulator (for the control system: 3.3V), the VDD (for the microcomputer: 5V), and the 3VDD obtained from the VDD via the 3.3V regulator (for the microcomputer: 3.3V).

In the WMA-supported mechanism CXK5661, the V2R5 obtained from the VD2 via the 2.5V regulator (for WMA decoder: 2.5V) is also used.

The microcomputer can turn on/off the CD driver (except for the load and eject modes) and the 3.3V signal by controlling the "CONT" and "CD3VON" signals respectively. To turn on/off the loading drive, there is no control terminal in the microcomputer, but the "LOEJ" input signal works as the control one. In the LCO output block, the "CLCONT" signal is used to switch between the loading mode and carriage mode.

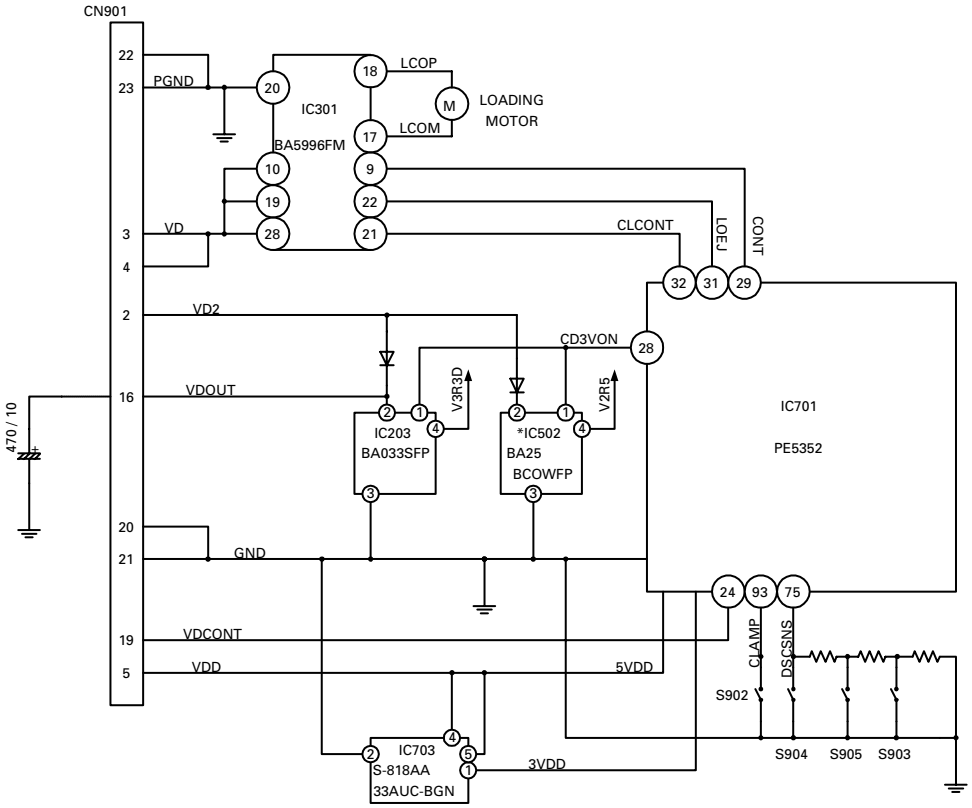


Fig. 1.4.1 Power supply/loading block (*: CXK5661)

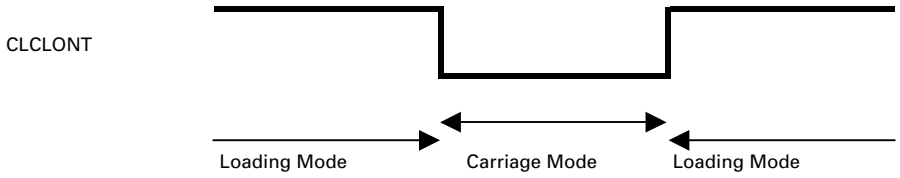
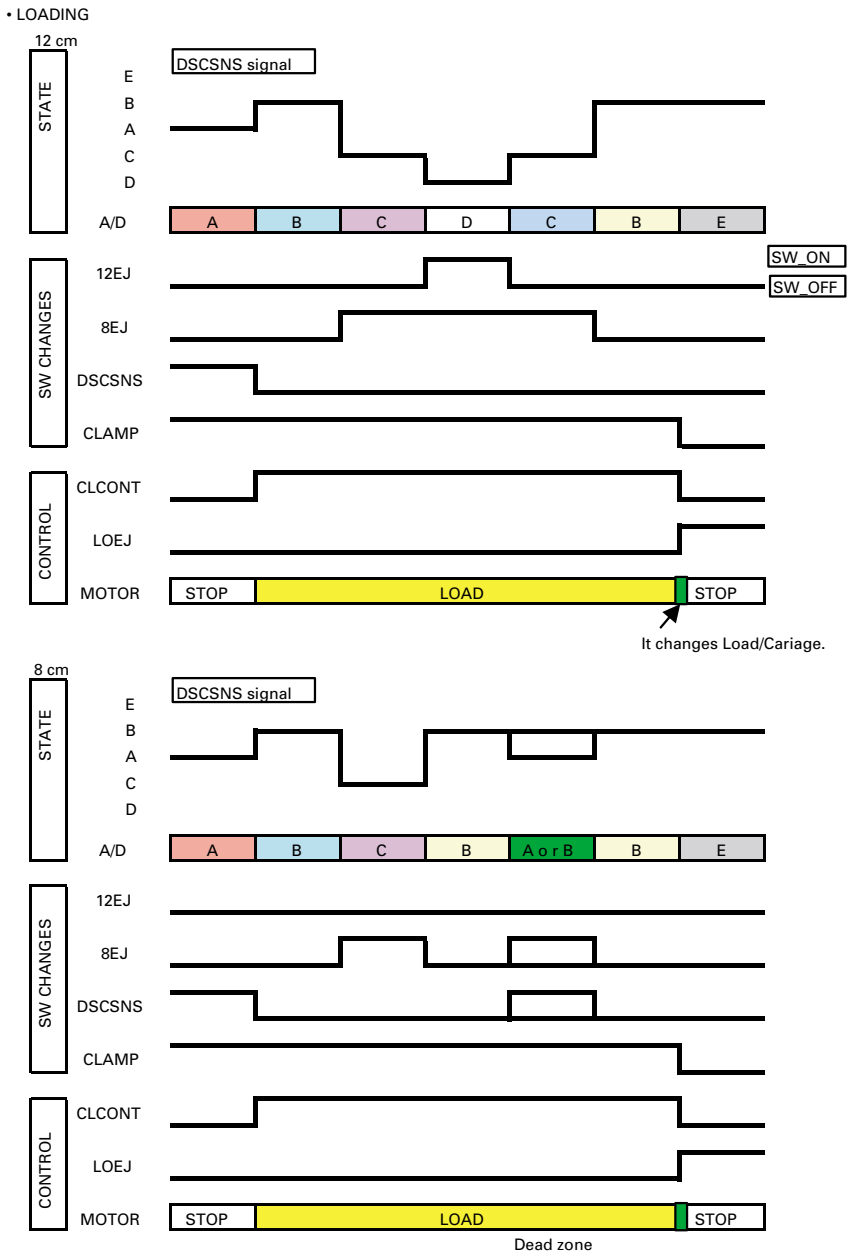


Fig. 1.4.2 Loading/carriage mode shift

To control the load and eject operations, the clamp switch located in the mechanism unit and the three detecting switches located in the control unit are used. Depending on the combination of these switches' ON/OFF status, the DSCSNS voltage changes.
The microcomputer can detect the status (A to E) by observing the voltage at the A/D port. The disc size detection (8 or 12cm) is also performed through this status change. The DSCSNS status and the status change in the load and eject modes are shown in the figures 1.4.3 and 1.4.4 respectively.

Status	A	B	C	D	E
SW1 S904	0	0	0	1	0
SW2 S905	0	0	1	1	0
SW3 S903	1	0	0	0	0
SW4 S902	1	1	1	1	0
Mecha	No DISC				CLMP

Fig.1.4.3 DSCSNS status



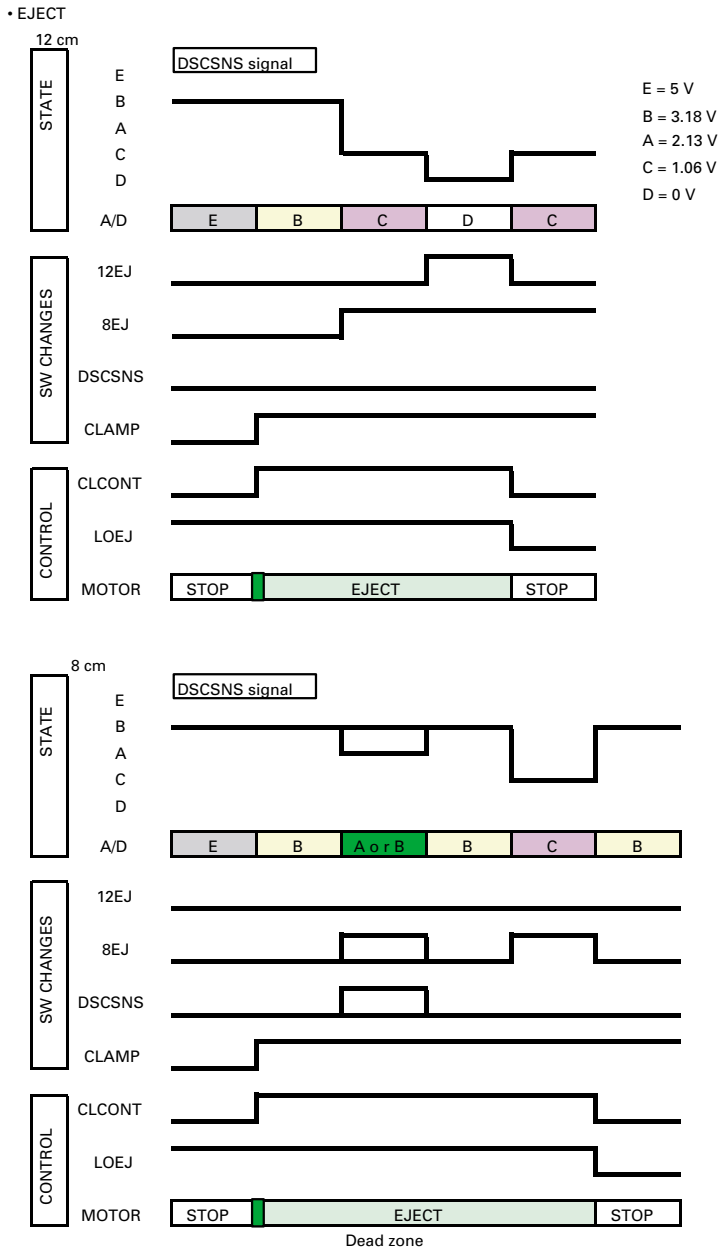
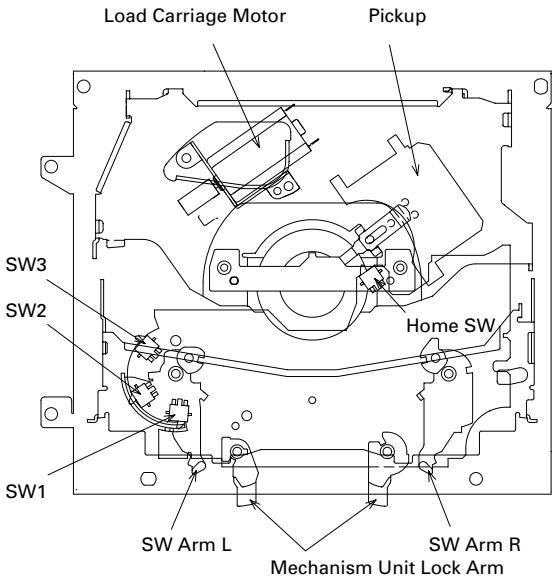


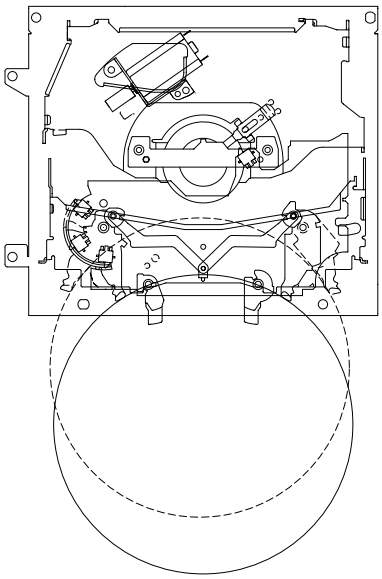
Fig.1.4.4 Status change in LOAD and EJECT modes

2. MECHANISM DESCRIPTIONS

● Loading actions

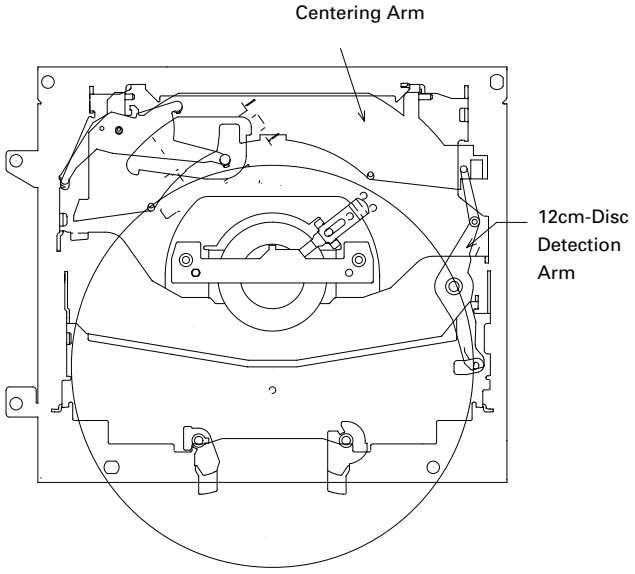
1. When a disc is inserted, SW Arm L and R rotate. Due to the rotation of Arm L, SW1 is switched from ON to OFF and the Load Carriage Motor starts.
2. If the disc is 12cm-disc, when it is carried to the position shown with the dotted line in the drawing, SW 3 switches to ON due to such rotation of Arm. Then, the microcomputer judges that the disc is 12cm-disc.
3. In case of 8cm-disc, the disc cannot reach such dotted line position, and from such limitation of approach, the microcomputer judges that the disc is 8cm-disc and simply triggers clamp actions.
   (Movement of SW Arm L and R are connected together. So, if pushing force is fed to only one arm, the distance between tow arms cannot be widened beyond the specific degree, because the coupling part is locked in such case.)

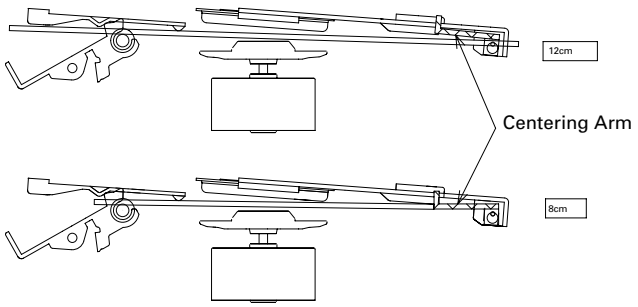




● Disc centering mechanism

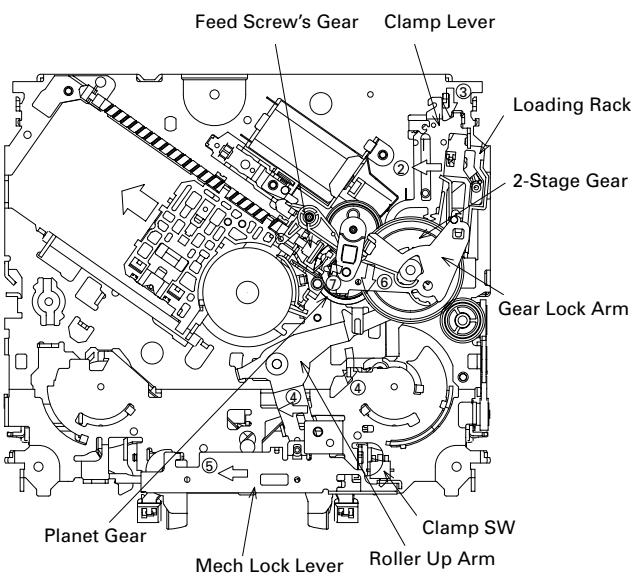
1. In case of 12cm-disc, the 12cm-Disc Detection Arm rotates, and with such rotation, it raises the Centering Arms to retreat the arms from disc's trace. The disc passes through under the arms, and at the inner part, it is centered.
2. In case of 8cm-disc, it is just centered at the position where its edge touches the front portion of the Centering Arm.

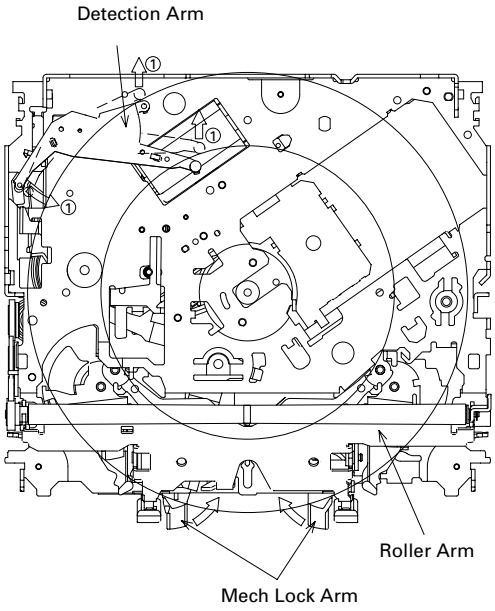




● Clamp actions

1. When an 8 or 12cm disc is placed on the center of the spindle, the detection arm starts moving.
2. The movement of the detection arm engages the loading rack with the 2-stage gear.
3. The clamp lever slides to lower the clamp arm. At this time, the roller up arm rotates to separate the roller arm from the disc. The roller arm moves the mech lock lever and turns the mech lock arm to release the mech lock. At the position where the clamp switch is turned off, the clamp operation ends.
4. After the clamp operation, the clamp lever moves to rotate the gear lock arm. The planet gear separates from the 2-stage gear to get engaged with the pickup feed screw's gear. Then the carriage operation will start.





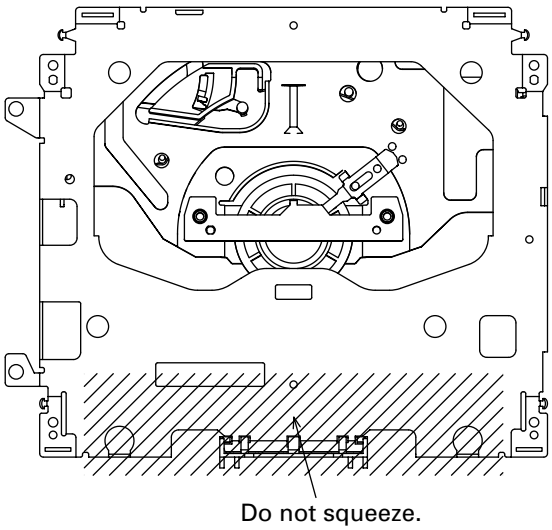
● Eject actions

1. Eject actions start when the Pickup is fed to the position inner than "Home SW ON" point in the internal circumference of the circle, caused by backward rotation of the Load Carriage Motor. Eject actions follow the foregoing procedures (steps taken in loading, centering and clamping actions), but each action in those steps is performed in reversed manner.
2. In case of 12cm-disc, Eject is completed when SW3 completes its condition- transition of OFF → ON → OFF.
3. For 8cm-disc, Eject is completed when SW2 completes its condition-transition of OFF → ON → OFF.

3. DISASSEMBLY

● How to hold the Mechanism Unit

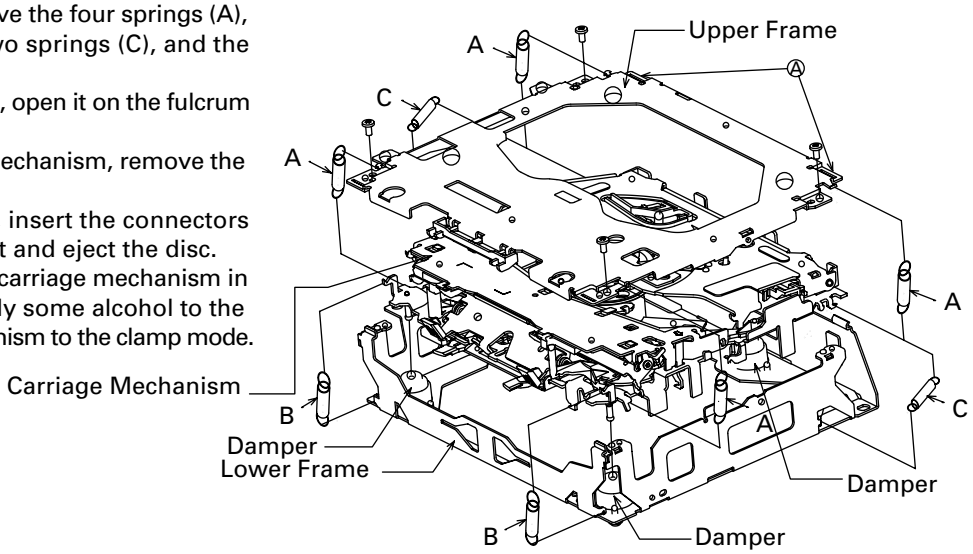
1. Hold the top and bottom frame.
2. Do not squeeze top frame's front portion too tight, because it is fragile.



● Removing the Upper and Lower Frames

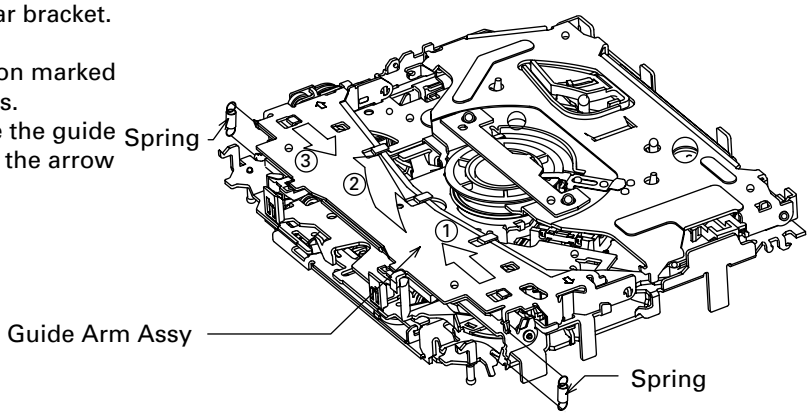
1. With a disc clamped, remove the four springs (A), the two springs (B), the two springs (C), and the four screws.
2. To remove the upper frame, open it on the fulcrum A.
3. While lifting the carriage mechanism, remove the three dampers.
4. With the frames removed, insert the connectors coming from the main unit and eject the disc.

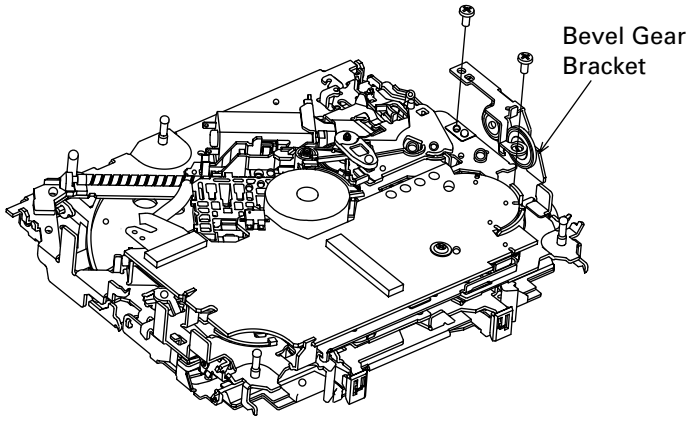
Caution: Before installing the carriage mechanism in the frames, be sure to apply some alcohol to the dampers and set the mechanism to the clamp mode.



● Removing the Guide Arm Assy

1. Remove the upper and lower frames and set the mechanism to the clamp mode.
2. Remove the two springs.
3. Remove the two screws and bevel gear bracket. Note that the gears come off.
4. Slide the guide arm assy in the direction marked with the arrow (1) and open it upwards.
5. At the angle of about 45 degrees, slide the guide arm assy in the direction marked with the arrow (3) to remove it.

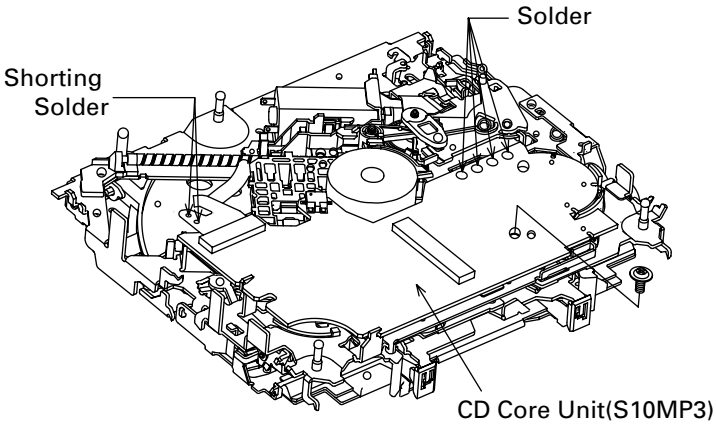




● Removing the CD Core Unit(S10MP3)

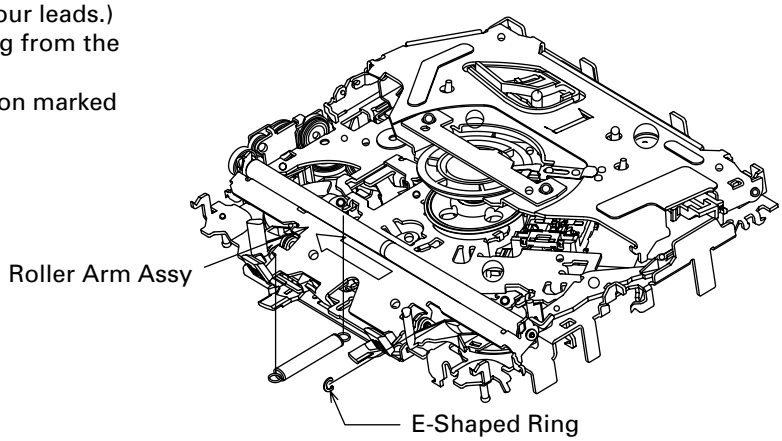
1. Apply shorting solder to the Pickup flexible cable. Disconnect the cable.
2. Remove the solder from the four leads, and loosen the screw.
3. Remove the CD core unit(S10MP3).

Caution: When assembling the CD core unit(S10MP3), set the mechanism to the clamp mode to protect the switches from any damage.



● Removing the Roller Arm Assy

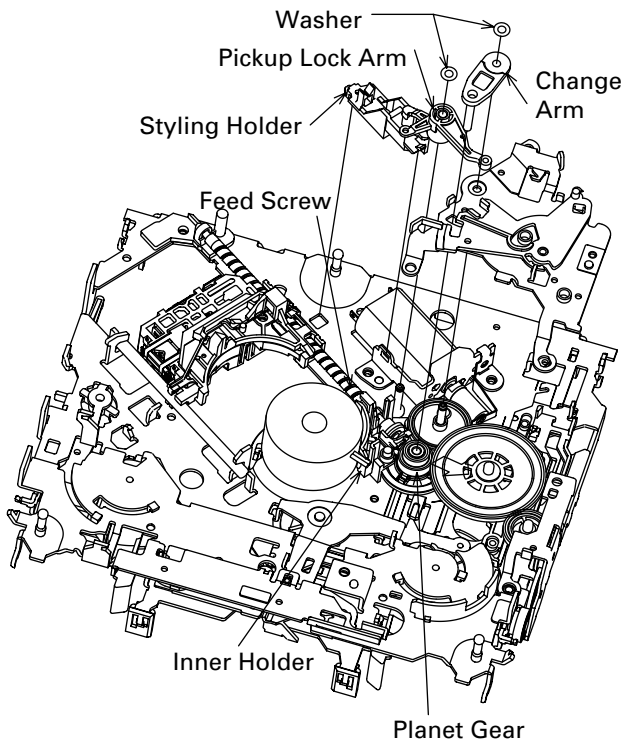
1. Remove the guide arm assy and set the mechanism to the eject mode.
2. Remove the CD core unit(S10MP3). (You do not have to remove the solder from the four leads.)
3. Remove the spring and E-shaped ring from the fulcrum shaft.
4. Slide the roller arm assy in the direction marked with an arrow.



● Removing the Pickup Unit

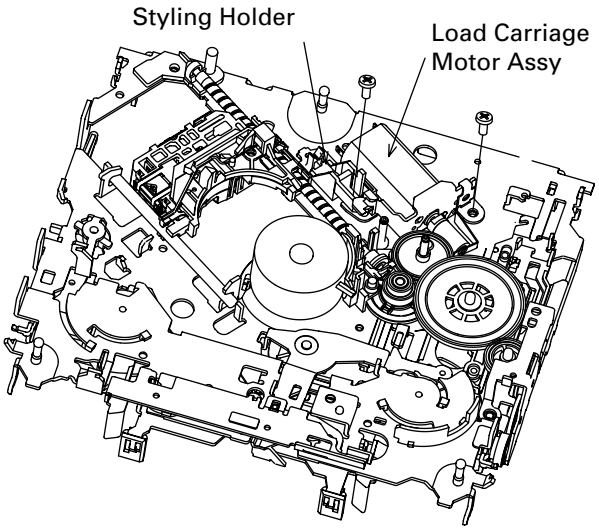
1. Set the mechanism to the clamp mode.
2. Remove the lead wires from the inner holder.
3. Remove the two washers, styling holder, change arm, and pickup lock arm.
4. While releasing from the hook of the inner holder, lift the end of the feed screw.

Caution: In assembling, move the planet gear to the load/eject position before setting the feed screw in the inner holder.



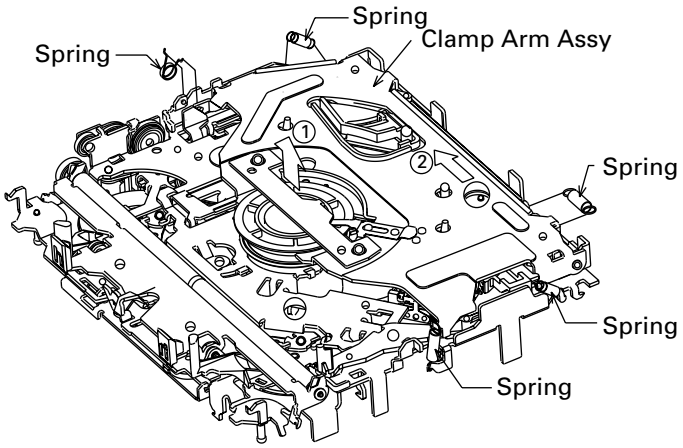
● Removing the Load Carriage Motor Assy

1. Release the leads from the styling holder and remove the holder.
2. Remove the two screws.
3. Remove the load carriage motor assy.



● Removing the Clamp Arm Assy

1. Remove the five springs.
2. While lifting the clamp arm assy, slide it in the direction marked with the arrow (2) to remove it.



● Removing the Spindle Motor

1. Remove the two screws. Take off the spindle motor.